

SilverKnETs Documentation

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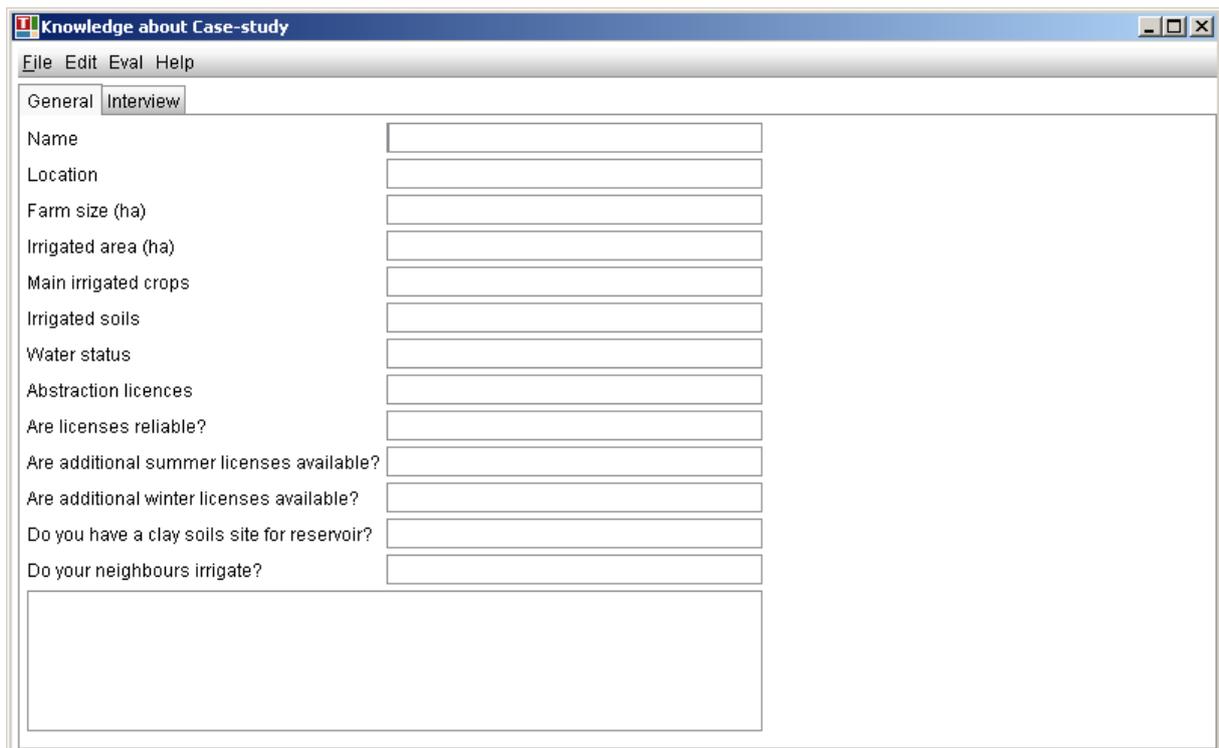
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CHANGES THAT REQUIRE IMMEDIATE IMPLEMENTATION TO MAINTAIN COMPATIBILITY

- Remote data storage service definition: The service is now required to return a code to indicate request success or error.

INTRODUCTION

SilverKnETs is inspired by the popular KnETs tool developed by Michael Fischer. SilverKnETs is implemented as a Microsoft Silverlight application (giving rise to the name SilverKnETs). Making use of Silverlight allows SilverKnETs to run as a web-based tool from a remote deployment, locally, or as an out-of-browser installation.



The screenshot shows a web application window titled "Knowledge about Case-study". The window has a menu bar with "File", "Edit", "Eval", and "Help". Below the menu bar, there are two tabs: "General" and "Interview", with "Interview" being the active tab. The main content area contains a list of questions, each followed by a text input field:

- Name
- Location
- Farm size (ha)
- Irrigated area (ha)
- Main irrigated crops
- Irrigated soils
- Water status
- Abstraction licences
- Are licenses reliable?
- Are additional summer licenses available?
- Are additional winter licenses available?
- Do you have a clay soils site for reservoir?
- Do your neighbours irrigate?

At the bottom of the form, there is a large, empty rectangular box, likely intended for a free-text response or additional notes.

Figure 1: Original knowledge elicitation tool (KnETs) by Michael Fischer.

INSTALLATION AND DEPLOYMENT

SYSTEM AND SOFTWARE REQUIREMENTS

The system requirements for SilverKnETs are very moderate. SilverKnETs will run on any version of the Microsoft Windows operating system that supports the Microsoft Silverlight plugin; this includes Windows XP, Windows Vista, Windows 7, Windows 8, and Windows 8.1. To run SilverKnETs, the Silverlight plugin, version 5, needs to be installed. Furthermore, for a web-based use of the SilverKnETs tool, a web browser needs to be installed that supports the Silverlight plugin. At the time of writing, this includes the recent versions of Microsoft Internet Explorer, Google Chrome, as well as Mozilla Firefox.

Typically, you will be prompted to install the Silverlight plugin if you run SilverKnETs for the first time without the plugin being available. However, you can also obtain the Silverlight plugin for installation manually from the Silverlight website at <http://www.microsoft.com/silverlight/>.

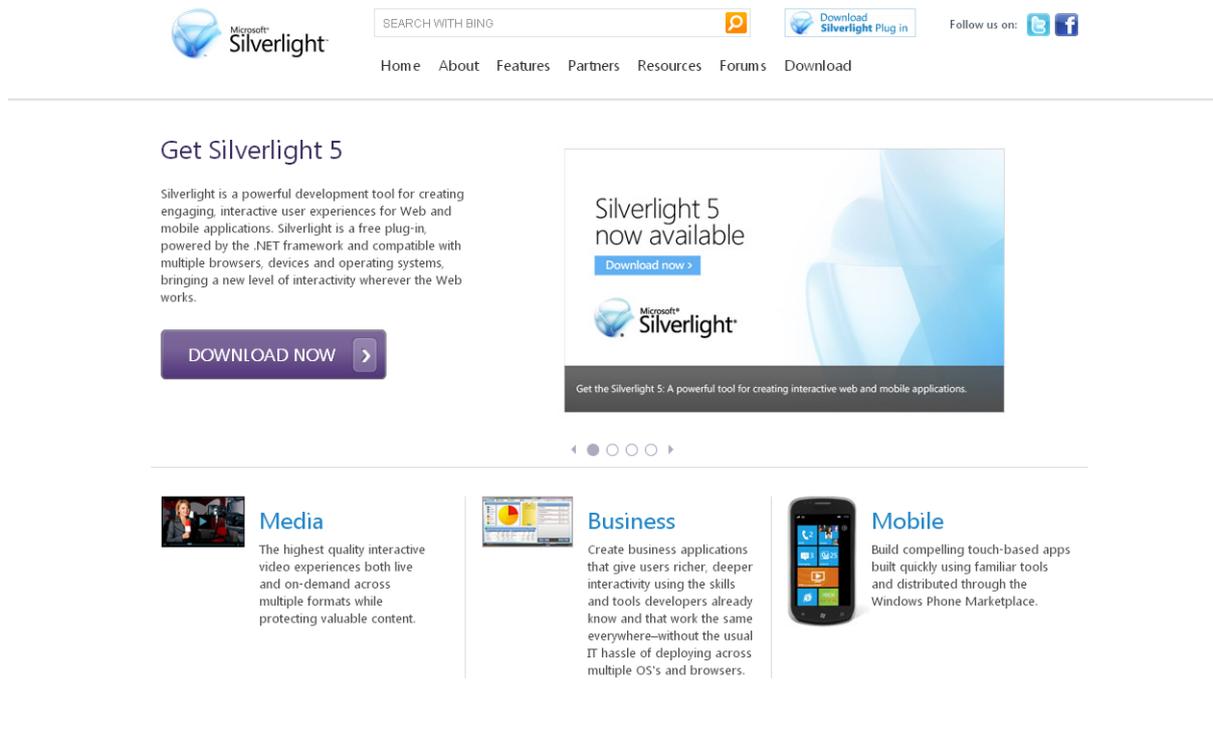


Figure 2: Microsoft Silverlight website.

USING SILVERKNETS AS A WEB-BASED TOOL

Using a web-deployed version of SilverKnETs is straightforward. Simply open SilverKnETs from the provided URL, i.e., the website that provides SilverKnETs, in any web browser compatible with the Silverlight 5 plugin. You should retrieve this URL from your administrator.

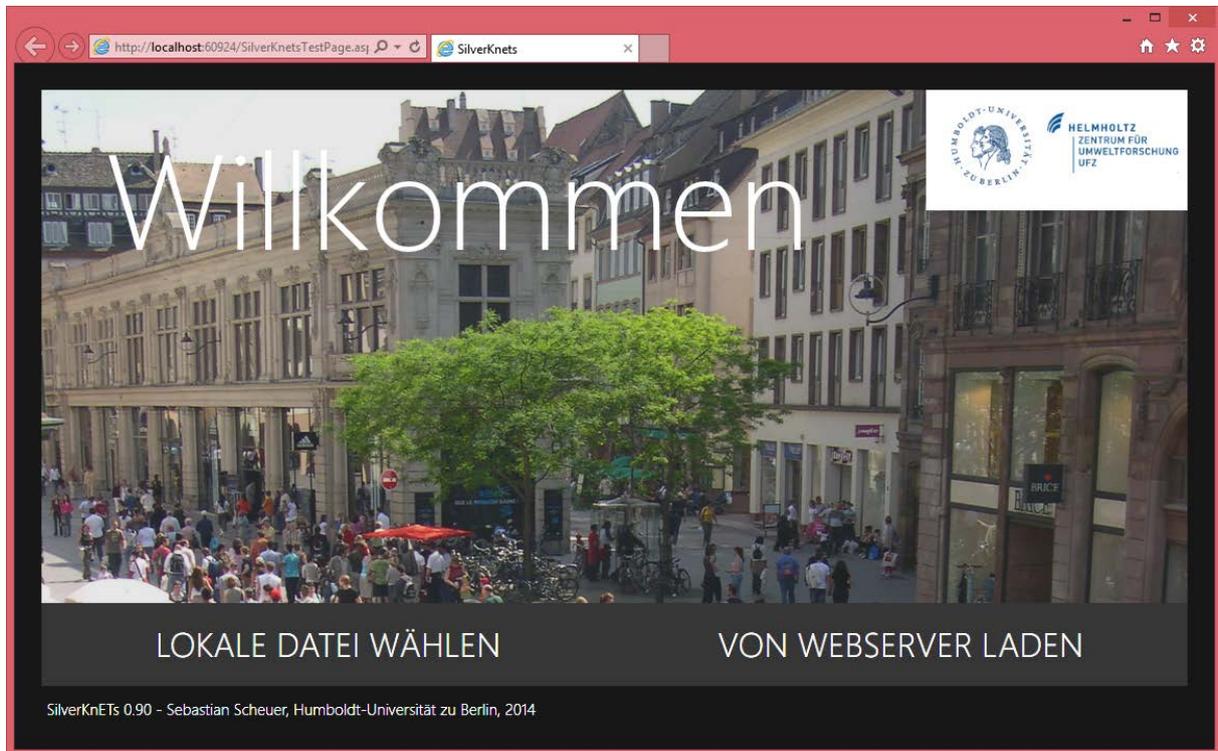


Figure 3: SilverKnETs running as web-based version in the Microsoft Internet Explorer web browser.

LOCAL DEPLOYMENT

Installation

Open the SilverKnETs tool as described in section 1.2. Once SilverKnETs has been loaded completely, right-click in the application's interface and select the option "Install SilverKnETs-Application on this computer" from the context menu. You will be prompted where a shortcut should be placed by the installation procedure, e.g., on the desktop or in the start menu. Click OK to install SilverKnETs.

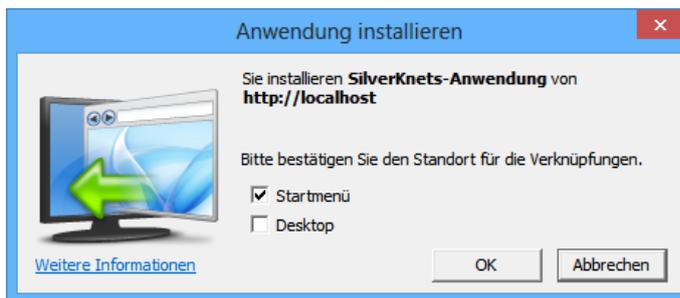


Figure 4: Installing SilverKnETs on the local computer requires the user only to choose where links shall be put by the installation routine.

Removal

Simply run the local SilverKnETs deployment, i.e., as out-of-browser application. Once SilverKnETs has been loaded, right-click in the application's interface and select the option to de-install the application.

KNOWLEDGE ELICITATION USING SILVERKNETS

KNOWLEDGE ELICITATION STEPS COVERED IN OR SUPPORTED BY SILVERKNETS

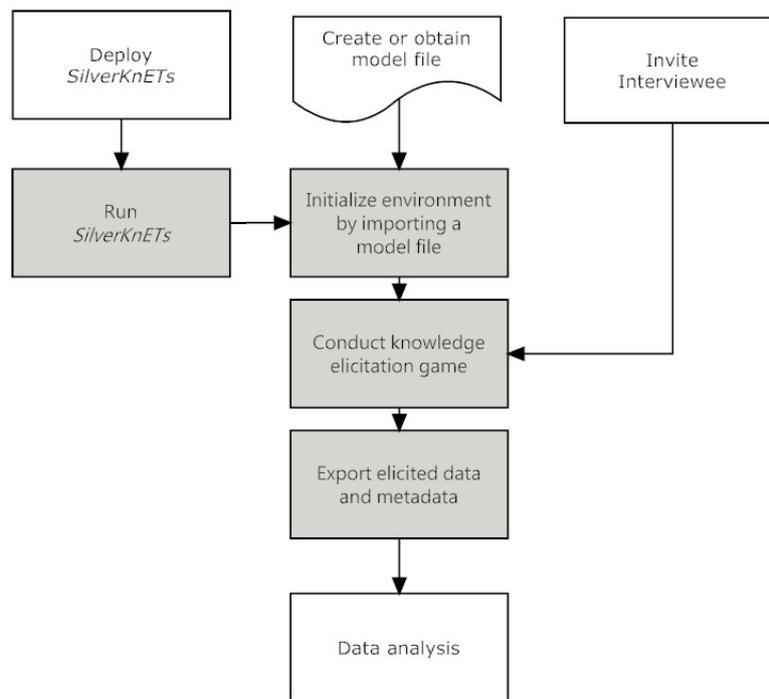


Figure 5: Knowledge elicitation process using SilverKnETS. The tool directly supports the grey-shaded steps.

SUPPORTED TYPES OF KNOWLEDGE ELICITATION GAMES

SilverKnETS provides two principal types of knowledge elicitation games: (i) a so-called individual game variant; and (ii) a conjoint game variant. The individual game variant creates a complete scenario, i.e., using all relevant variables defined in the model. Furthermore, decisions and reasoning are rendered on the game page. Depending on the game's configuration, the interviewee will be required to select one (or more) decision and reasons that led to the decision (or decisions) in question. Conjoint interviews may e.g. be used to elicit data for the validation and evaluation of models. In conjoint games, different scenarios are rendered to the screen, and the interviewee must decide for one of them. Scenarios in conjoint interviews may include identical or different variables and either a complete set or a subset of all variables defined.

CONDUCTING INTERVIEWS

DEFINITION OF PAGES

SilverKnETs includes a set of so-called pages, or screens. Each page serves a particular purpose and may be shown during an interview depending on the configuration and type of deployment of SilverKnETs. In total, the following pages are defined:

Welcome

The "Welcome" page is shown after SilverKnETs is loaded completely. It may provide means to select/open a model file, or may show an introductory text.

Interview introduction page

The "Game introduction page" is shown after a model file has been loaded completely. It summarizes the questionnaire/interview by rendering a title and an introductory text.

Interview type selection page

The "Interview type selection page" is shown after the "Interview introduction page". It allows selection of one or more types of interviews, e.g., individual or conjoint interviews.

Interview page

The "Interview page" is iteratively shown to the interviewee. It is the core page of each interview. Its appearance is dependent on the type of interview and the configuration in the model file.

Data export page

The "Data export page" allows reviewing and export of elicited data by the interviewer.

WELCOME PAGE

To conduct a knowledge elicitation game/interview, a model file is needed that initializes and configures the SilverKnETs environment. Such a file needs to be imported into the SilverKnETs tool if it is e.g. locally deployed. SilverKnETs supports local model files as well as remote files hosted on the World Wide Web.

After starting SilverKnETs, simply click the appropriate button to load a model file. If you click on local file selection, an open file dialog will appear that prompts to select a model file. For the selection of a model file that is located on a remote server, click the appropriate button and enter the URL and security credentials as required.

A remote, public-access deployment may only show an introductory text, but must not require selecting a model file.

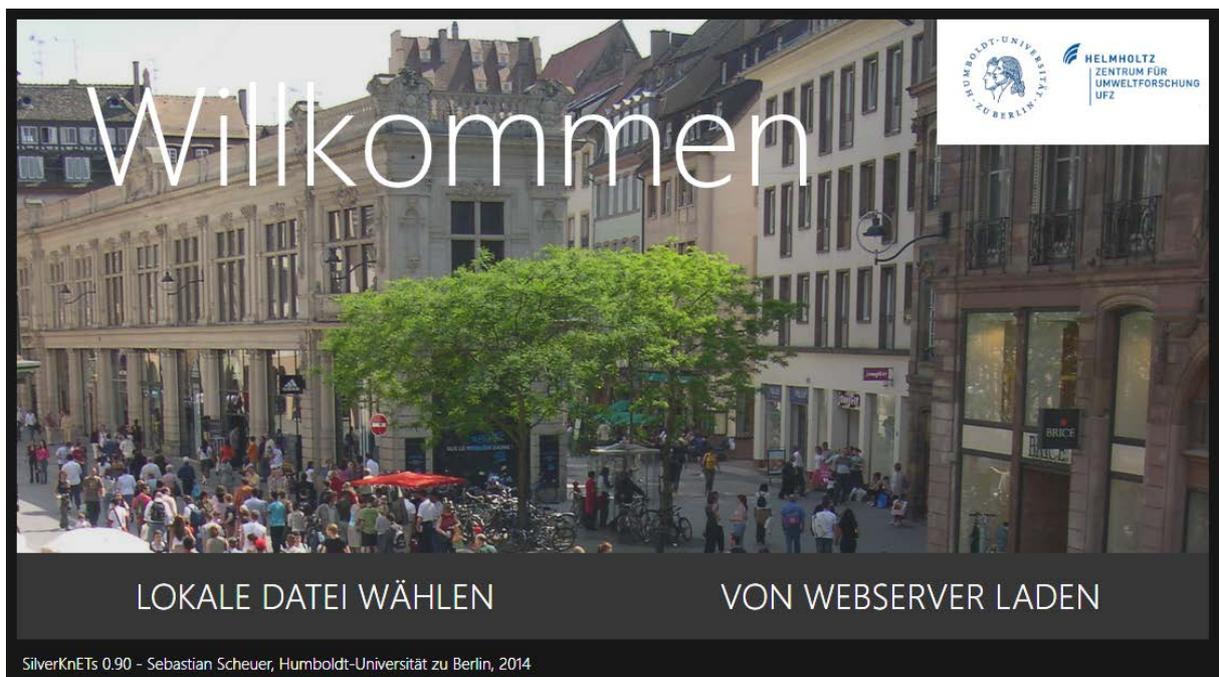


Figure 6: Start screen of SilverKnETs that allows selecting a source for a model file.

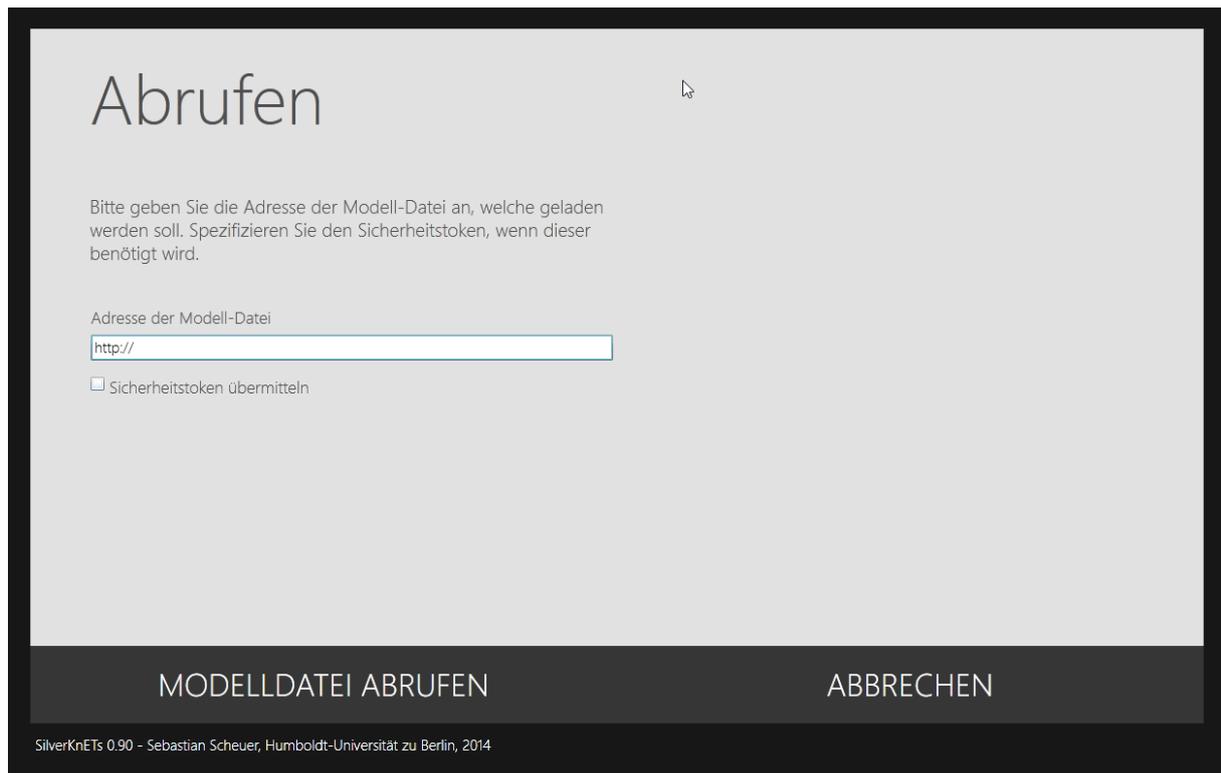


Figure 7: Importing a remotely hosted model file requires the user to provide the complete URL of the model file. Furthermore, security credentials can be provided if required.

INTERVIEW INTRODUCTION PAGE

After the model file has been loaded, an introduction page is shown that summarizes the questionnaire/interview. It shows a title and an introductory text. Click "Begin" to start the interview or click "Cancel" to return to the welcome page. See the SilverKnETs Model Language (SML) reference for further information.

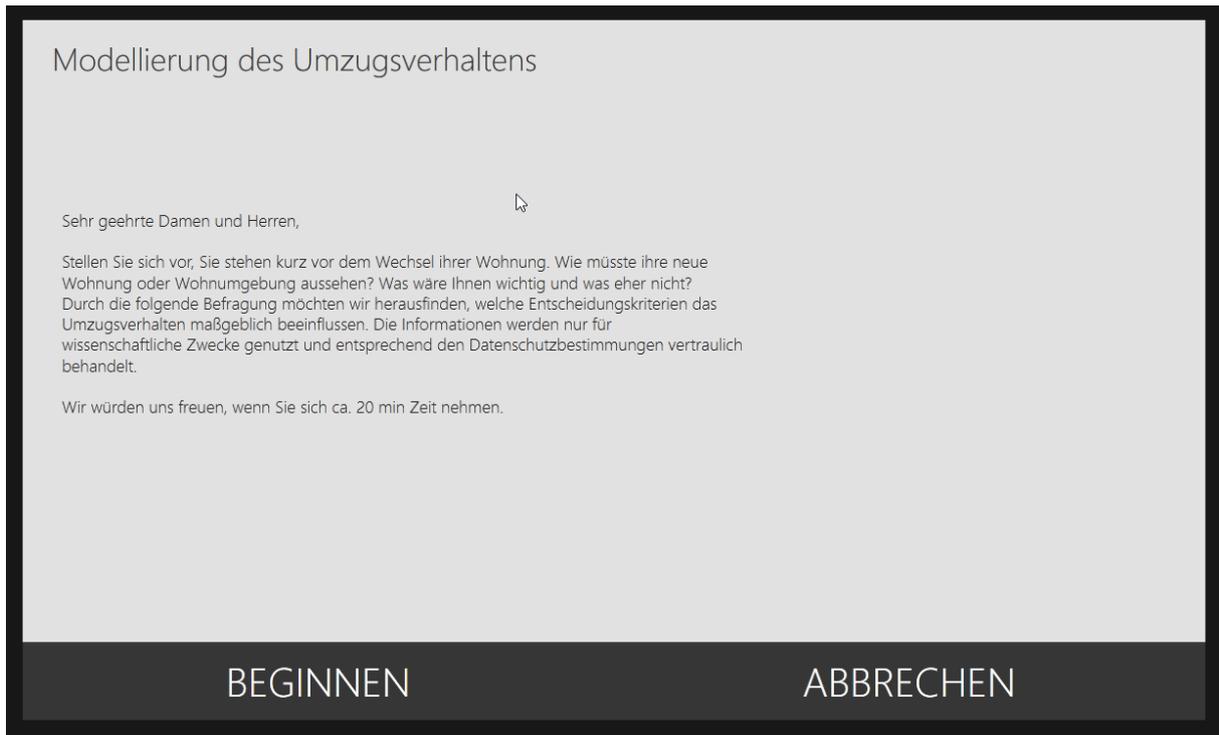
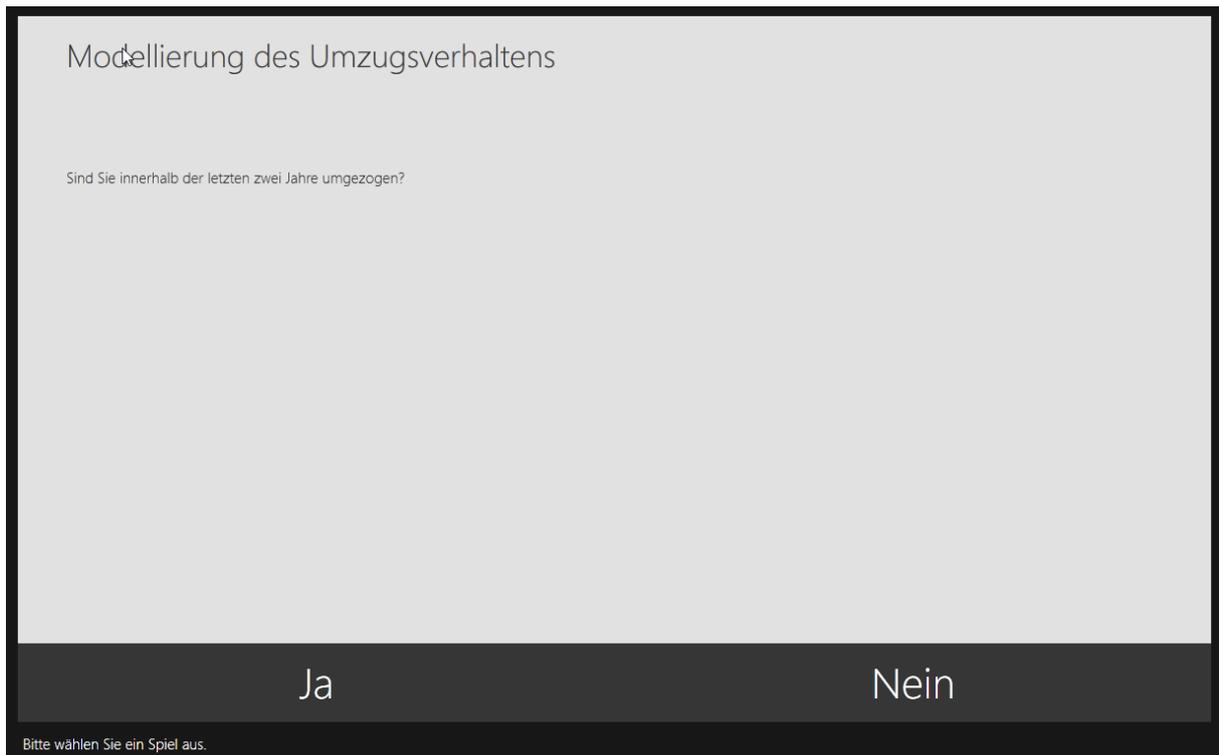


Figure 8: SilverKnETs interview introduction page.

INTERVIEW SELECTION PAGE

The interview selection page is designed in that a particular type of interview can be chosen, e.g., by answering a question as defined in the model file. In the model file, also the offered types of interviews are specified. By clicking on a button as instructed by the text shown in the page, a particular type of interview is started. See the SilverKnETs Model Language (SML) reference for further information.



Modellierung des Umzugsverhaltens

Sind Sie innerhalb der letzten zwei Jahre umgezogen?

Ja Nein

Bitte wählen Sie ein Spiel aus.

SOCIODEMOGRAPHIC BACKGROUND PAGE

If specified for the interview in progress, sociodemographic data may be required from the interviewee. That data is elicited on the sociodemographic background page. See the SilverKnETs Model Language (SML) reference for further information.

Bitte beantworten Sie die folgenden Fragen

Geschlecht	<input type="text"/>
Alter	<input type="text"/>
Erwerbsstatus	<input type="text"/>
Einkommen (Euro)	<input type="text"/>
Qualifikation	<input type="text"/>
Personen im Haushalt	<input type="text"/>
Haushaltstyp	<input type="text"/>
Stadtteil	<input type="text"/>
Wann war Ihr letzter Umzug (Jahresangabe)?	

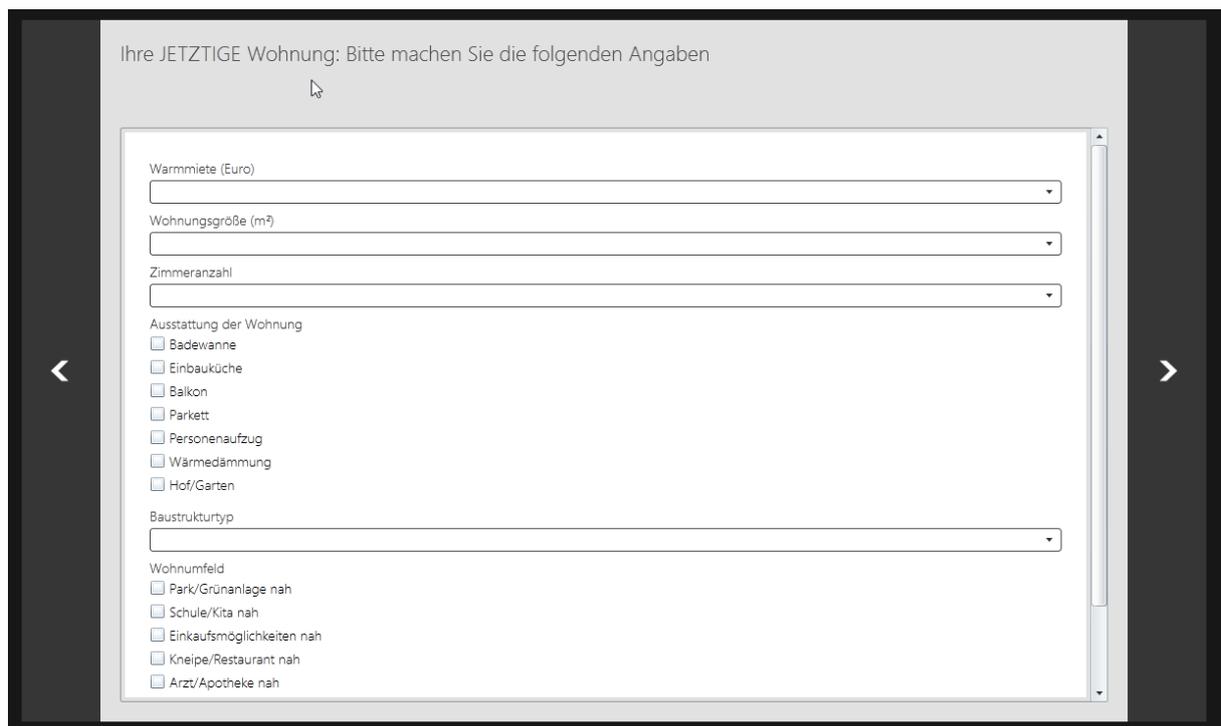
>

Figure 9: Sociodemographic background page.

INTERVIEWEE SITUATION PAGE

The interviewee situation page may be presented after the sociodemographic background page, if configured.

Here, the questions/variables defined for the interview in progress are shown to the interviewee. The interviewee must provide answers to these questions in regard to his or her personal background/situation.



The screenshot displays a web interface for an interviewee to provide information about their current housing. The title is "Ihre JETZTIGE Wohnung: Bitte machen Sie die folgenden Angaben". The form contains several sections:

- Warmmiete (Euro)**: A dropdown menu.
- Wohnungsgröße (m²)**: A dropdown menu.
- Zimmeranzahl**: A dropdown menu.
- Ausstattung der Wohnung**: A list of checkboxes for:
 - Badewanne
 - Einbauküche
 - Balkon
 - Parkett
 - Personenaufzug
 - Wärmedämmung
 - Hof/Garten
- Baustukturtyp**: A dropdown menu.
- Wohnumfeld**: A list of checkboxes for:
 - Park/Grünanlage nah
 - Schule/Kita nah
 - Einkaufsmöglichkeiten nah
 - Kneipe/Restaurant nah
 - Arzt/Apotheke nah

Figure 10: Interviewee situation page.

Depending on the type of random event defined for each variable, the answers given by the interviewee may be used in the process of random event generation. E.g., a variable "Income" may be defined. The interviewee provides his or her income, e.g., "1000 Euro". The answer "1000 Euro" may then be used to create random situations during the interview, e.g., "higher than 1000 Euro", in case that such a type of situation is defined for the given variable in the model file. See the SilverKnETs Model Language (SML) reference for further information

INTERVIEW PAGE

The appearance of the interview page depends on the type of interview. In either case, it is shown iteratively to the interviewee to make decisions or indicate preferences dependent on the currently active interview and the configuration in the model file.

Würden Sie unter folgenden Bedingungen umziehen?

Scenario 1	Entscheidung	Begründung
<input type="text" value="1200 bis unter 1500 Euro warm"/>	<input type="radio"/> Zu Favoriten	<input type="checkbox"/> Eckdaten
<input type="text" value="80 bis unter 100 m²"/>	<input type="radio"/> Kommt prinzipiell in Frage	<input type="checkbox"/> Veränderte Jobsituation
<input type="text" value="5 und mehr Zimmer"/>	<input type="radio"/> Kommt nicht in Frage	<input type="checkbox"/> Ausstattung
<input type="text" value="Badewanne"/>		<input type="checkbox"/> Versorgung und Arbeiten
<input type="text" value="Einfamilienhaus unsaniert"/>		<input type="checkbox"/> Empfehlung von Freunden
<input type="text" value="Schule/Kita nah"/>		<input type="checkbox"/> Andere Gründe
<input type="text" value="Leipziger Umland"/>		<input type="text" value=""/>
		<input type="text" value=""/>

DATA EXPORT PAGE

Once a knowledge elicitation game has been finished, the data export page is shown. On this page, a table is shown with three tabs:

- A personal data tab, that holds sociodemographic background information and summarizes the interviewee's situation;
- An elicited data tab that shows the situations for each variable per scenario, the interviewee decisions and reasoning in a tabular form;
- An export tab, which allows exporting the elicited empirical data to different formats, locally or remotely.

You may choose to display either the view data model or export data model values. Please note that exported data automatically makes use of the export data model.

Clicking the "Finish" button at the bottom will return the interviewee to the SilverKnETs welcome page. Note that, if SilverKnETs is deployed for the general public, the Data export page may not be shown. Instead, a different page may be shown to conclude the interview.

Befragungsergebnisse exportieren

PERSÖNLICHE DATEN ERHOBENE DATEN EXPORTIEREN

[SOCIOECONOMIC DATA]
Geschlecht: Männlich
Alter: 30 bis unter 40 Jahre
Erwerbsstatus: teilzeit- oder stundenweise erwerbstätig
Haushaltseinkommen (Euro): 1100 bis unter 1600
Qualifikation: Teilfacharbeiterabschluss
Personen im Haushalt: 12
Haushaltstyp: Ich lebe mit Partner/in, mit Kind/ern.
Stadtteil: Paunsdorf
Wann war Ihr letzter Umzug (Jahrsangabe)?: 12

[Jetzige Wohnung]
Warmmiete (Euro): 300 bis unter 400 Euro
Wohnungsgröße (m²): 40 bis unter 60 m²
Zimmeranzahl: 4
Ausstattung der Wohnung: Einbauküche
Baustukturtyp: Altbau unsaniert
Wohnumfeld: Park/Grünanlage nah
Lage: Stadtzentrum Leipzig

Ansichts-Modell Export-Modell

BEENDEN

Model 416bcde6-1de8-41eb-9b99-7f32bc899f65

Figure 11: Data export page.

SILVERKNETS DATA MODELS

SilverKnETS distinguishes two data models: the view data model and the export data model. The view data model determines which information is shown to the user and how, i.e., it is used to determine how to render and format situations for each variable.

The export data model can be used to specify how information is exported, e.g. to a csv-file. By defining the two data models, on-screen presentation of the interview and the actually exported "raw data" can be separated. This may be used to localize interviews, but retain a standardized data format for later analysis.

Please refer to the SilverKnETS Model Language (SML) reference for further information.

CREATING A SILVERKNETS MODEL FILE

Please refer to the SilverKnETS Model Language (SML) reference for further details.

APPENDIX

SPECIFYING A SILVERKNETS UI CULTURE

An UI culture for SilverKnETS is specified by setting an attribute in the object parameters that embeds the Silverlight object in a HTML page.

PUBLIC DEPLOYMENT OF SILVERKNETS

Public deployment is controlled by setting a parameter in the Silverlight object's code that embeds the application in a HTML page.

REMOTE DATA STORAGE SERVICE DEFINITION

At the moment, SilverKnETs supports only a simple server-side storage mechanism. If the user decides to save data to a remote host, the user is required to enter the remote service URI that will handle the actual data storage (if that service requires authentication on .htaccess level, the user will be asked for the credentials during the upload process, cf. Figure 12; note that no service-level authentication is supported at the moment, e.g., a user authentication against a user database).

The actual remote service can be implemented in any server-side language. No special methods are required to be exposed by the service. SilverKnETs, at this current stage of implementation, will simply post a unique model identifier (a global unique id generated by the .NET framework), the sociodemographic data and personal situation data, as well as the elicited knowledge, as URL-encoded form data. The following POST fields are used that may be read out and used by the remote service as desired:

POST field name	Field content
modelname	The unique model identifier (e.g., 88bfdadb-1ef5-4310-9852-1d0fbccf5f61). The global unique identifier is created as random but unique identifier. It does not allow personalization of the elicited data.
sociodemographicdata	The field contains sociodemographic data as csv-formatted text using ";" as separator.
personalsituation	The field contains data on the interviewee's personal situation as csv-formatted text using ";" as separator.
knowledge	The field contains the situations, i.e., random events, the decisions and reasoning of the interviewee in csv-format. A default separator ";" is used.

The service is required to issue specific return codes.

Return code	Meaning
201	Data is successfully stored on server.
500	Internal server error. Data storage not successful.

The server must return the code 201 on success. On error, the error code 500 needs to be returned. The return value is evaluated by SilverKnETs. If an error code is returned, the user may be given the chance to retry data upload.

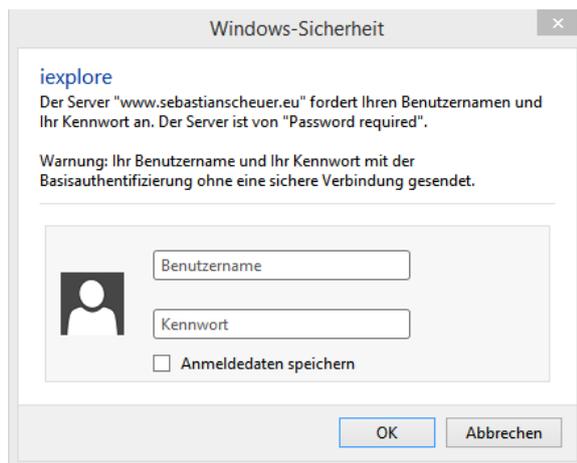


Figure 12: User prompt for remote data storage service credentials.

REMOTE DATA STORAGE SERVICE EXAMPLE

A simple example is provided below which is written in PHP. It will read out the POST fields, generate three unique filenames based on the model's (automatically generated) unique identifier, and store the retrieved data in these files. One file is the csv file, the other two csv files store the respective metadata.

The success return value "201" is returned if the data has been stored successfully. The error code "500" is returned otherwise.

```
<?php
```

```
try
{

$modelname = $_POST["modelname"];
$metadatasocial = $_POST["sociodemographicdata"];
$metadatasituation = $_POST["personalsituation"];
$knowledge = $_POST["knowledge"];

$namecsv = $modelname . ".csv";
$nameSOC = $modelname . ".metadata.sociodemographic.csv";
$nameSIT = $modelname . ".metadata.personalsituation.csv";

$filecsv = fopen( $namecsv, "w" );
fwrite( $filecsv, $knowledge );
fclose($filecsv);

$fileSOC = fopen( $nameSOC, "w" );
fwrite( $fileSOC, $metadatasocial );
fclose($fileSOC);

$fileSIT = fopen( $nameSIT, "w" );
fwrite( $fileSIT, $metadatasituation );
fclose($fileSIT);

echo "201";

}
catch(Exception $e)
{
echo "500";
}
}
```

```
?>
```

