low fidelity (lo-fi) prototype of a user interface for a 3D indoor navigation application

Current GPS isn’t going to aid shoppers navigating labyrinth-like indoor or underground malls, nor for that matter help fresh students find their way within the sprawling academic complexes of NTU

A technology company, VirtualUsher wants to be the first on the market for an **indoor navigator**. In preparation, it is seeking a consultant designer (you) to come up with a potential design for the user interface (UI) to an **indoor navigation application**.

The navigator will either run on specialized device, or a smartphone. A rough indication of the device is provided:

-**The form factor of the device will be that of a smartphone**, i.e. it will fit the palm of a hand (so roughly 4-5 inch display).

-The high-resolution colour display has **multi-touch capabilities**.

-The device will be **able to detect its indoor 3D position to sub-metre accuracy, and also its 3D bearing** (3D direction, e.g. via tilt sensors and electronic compass)

VirtualUsher has specified a list of features for the application.

-The application must **automatically find a path from the user’s current position to a specified internal “address”** (e.g. a room number, name of office or shop, etc.) destination within an indoor space.

-It must be able **to provide turn-by-turn (or more generally action-by-action) guidance** to get the user to the destination.

-It must be able to **handle navigation in 3D space**, since indoor spaces have multiple floors (unlike GPS navigators for navigation on a 2D ground).

-It must be able to **cater for all ways of getting between floors**, **including lifts, stairs and escalators, as well as ramps**.

-It must allow the user to **search for the indoor destination**, e.g. by specifying a room number, name of office or shop, etc.

In your prototype, you have to come up with design concepts for the UI in the scenario above, implementing the stated features within the scope of the given specifications.

*Beyond these key features, your main focus for your design should* ***not*** *be on providing extra features, but rather on exploring different ways to enhance the quality of the user experience through nice interface visuals and intuitive user interaction. You should not assume you are limited in any way to software and platform constraints or other unnecessary conventions (e.g. ask yourself: do buttons really have to be rectangular? Do they really have to be arranged in a grid? Think out of the box!)*

* Creatively think of the UI most suitable for the features described earlier. You should take into account the following points:
  + The interface needs to enable the features described above.
  + Interface design: what is the look-and-feel of the interface going to be? Does the interface follow the important principles of good interface design?
  + Experience design: what kind of experience will the user get out of interacting with the application? Are some forms of interaction more appealing and natural?
* **Sketches of your lo-fi prototype design**. You can use **up to 4 A4 pages** to illustrate your design using a few sketches. A “page” here means one side of a piece of paper.
  + Please scan your sketches or at least take a *clear, high quality, high resolution* photo. ***Only* digital submissions are needed**. ~~However, because the TA grader now has to only rely on your digital submission,~~ make sure that you *scan or photograph your design carefully at high resolution*, otherwise the grader may reduce your marks if the details are not legible.
  + ~~The sketches/drawings handed in~~ ***~~must~~*** ~~be created by hand sketching (whether on a physical medium, or by stylus on a tablet and printed).~~

You are expected to make your design obvious based on your sketches alone, which can include substantial annotation.

The assessment of the deliverables (i.e. your sketches) will be based on the following four components which are weighted equally:

1. **Relevance of Design.** Does your design implement the specified features? You have the freedom to decide the form and manner of providing these features in your interface, so long as the intended functions remain.
2. **Originality of Design.**~~Your design will be compared to the designs of other students in your cohort. The more unique your design is in terms of form, interaction and overall look-and-feel, the higher you will score for this component. Students with near-identical designs will likewise score near-zero for this component.~~

* **Quality of Design.** Does your design reasonably adhere to, or clearly violate, basic UI design principles, such as Schneiderman's Golden Rules? ~~If you want to break a particular principle because you believe there is an exceptional reason, please consult your lab supervisor first to seek clearance, then clearly justify it in your submission.~~
* **Clarity of Submitted Material.** Based on your submitted sketches, is it reasonably easy for a reader to understand how the user will be interacting with your interface? Is there sufficient annotation to make the interface and interaction clear? Are important transitions diagrammed? Are there particularly outstanding illustrations of interaction and usage that deserve extra marks?

The assessment is based more on your interface following established design principles with interesting originality, good usability and providing an enjoyable interaction experience for users. Nevertheless, it is also important to have clarity in your sketches, otherwise the instructors won’t understand your design.

**Preparatory Material**

~~- You do not need to be clear about all the concepts in these pages– they will be covered in detail in the lectures. You just need to understand: a) what is a prototype, which is obvious just by looking at the example prototypes provided in these pages; b) the difference between low-fidelity (lo-fi) and high-fidelity (hi-fi) prototypes so that you will~~ **~~not~~** ~~design a high-fidelity prototype at this stage.~~

- **Quick Primer on Sketching for Lo-Fi User Interface Prototypes** provides examples of lo-fi prototype sketches, and also suggests different things that you can sketch.

**What to present in your lo-fi prototype?**

Please pay attention to the following aspects of your lo-fi prototype:

* + **Key features**. Make sure that your prototype clearly illustrates the key features.
  + **Annotations**. If certain features or functionality are not obvious from the drawings alone, please provide brief annotations to help viewers understand your design.
  + **Temporal aspects**. When temporal considerations are involved in the desired features (e.g., a user action that can only be taken after another action), make sure that you capture in the sketch any temporal aspects of the interaction. That is, the sketch does not have to be like a “screenshot” of the user interface but rather it should depict the essence or spirit of the user interaction as much as possible.
  + **Modes**. The student can also sketch different modes of the interface if it changes depending on the current state of the application. Say if you are designing a GPS navigator, the different modes may include a search mode and a navigation mode.

**How to prepare your lo-fi prototypes?**

The most conventional way is to use pencil and paper, and draw your design on the paper. An alternative is to draw electronically, say by sketching on a tablet with a stylus (do not use your finger as your fingertip is not fine enough!), and then print the design on paper. Please note it is mandatory that you draw by direct hand sketching without using special software tools

Submit your lo-fi sketches as a **softcopy to NTUlearn by 11.59pm on your deadline date**. State your name and your CZ2004 lab group. It should contain **~~Up to~~ 4 A4 pages** of your ***lo-fi*** prototype sketches. **Do not design a hi-fi prototype.**

Possible things to sketch

1. The main interface itself
2. Other pages
3. Different modes and transitions of the interface
4. The user in action (similar to 2 but step by step example)

-annotate to show what each button does and more

* Scenarios
  + Daily-use scenarios
    - E.g. Input search criteria, browse search results, compare search results
  + Necessary scenarios
    - E.g. Make payment
  + Edge-case scenarios
    - E.g. Log-in, configuration

-Also can consider catering to novice, intermediate and expert users

Scenarios help you to concentrate on your goal, can check if each scenario contributes to the fulfillment of the goal. It can guide later design and become a page or a section

-Some sample layouts for interface on the ppt

-Should aim to integrate the F-shaped pattern for mobile browser since they conducted research on it

* Focus of the design:
  + **Functionalities** 
    - 1 level down from your scenarios
    - Establish a flow for each scenario
  + **Structure**
    - Match your scenarios
    - consistency
  + What kind of **interactions** would your app have?
    - Data input (text box, clickable icons, check-boxes)
    - Information presentation (amount of info, format)
    - Navigation (drop down menus e.g. in searching for locations)
    - Browsing
    - Conversing (dialogue to yield closure, offer info)
    - Interacting objects (clickable calendar, list + slider)
* Tips
  + Review existing products/design =>
    - Always easier to spot others’ errors than your own
    - Serve as design templates
    - Learn from good designs, Improve on bad designs
  + Use annotations to convey stuff not conveyable via imagery
    - Add dynamics into static drawing (transition between pages, click effects)
  + Be consistent
    - Consistent structure
    - Consistent annotation (otherwise may confuse reader), e.g. using a legend
  + Think about the guidelines during low-fi design (easier to changes, ensure usability)
    - 8 golden rules
    - (for evaluating after designing) ~~5 human factors central to community evaluation~~ (e.g. to reduce no. of clicks needed for data entry; speed of performance)

**Shneiderman’s 8 golden rules for good design**

1. Strive for consistency
2. Cater to universal usability **(e.g. add language options)**
3. Offer informative feedback **(e.g. some indicators of what is selected/computer state)**
4. Design dialogs to yield closure
5. Permit easy reversal of actions **(e.g. one can edit slider filter and view refreshed results immediately)**
6. Support internal locus of control **(i.e. give users some control over what kind of stuff to search, e.g. advanced search options)**
7. Reduce short term memory **(e.g. Search criteria are recorded and displayed, no need to recall)**
8. Prevent errors **(try to make it impossible for the user to make any errors, e.g. via autocorrect, spelling suggestions e.g. when searching for places)**

Some guidelines:

–  Ensure that embedded links are descriptive (i.e. describe the destinations)

 -Use radio button for mutually exclusive choice and check boxes for multi-answer choices

-Main/1st interface could ideally be very clear and attractive for 1st time users, so they can know what to do

-system state and action alternatives can be made visible

-can show options as to what to do next?

-user should receive continuous feedback in some way

Ideas for standing out:

-well drawn, using a tablet and stylus may make that easier to achieve

-follow google maps style

-it seems they may prioritise many info displayed over simplicity. Maybe but I think no need excessive features other than those in the qn

-take all features from google maps and follow the ppt example in displaying many things

-can take a look at iOS/google app design guidelines; can try to model it based on how the google maps should appear in your phone.

-have the idea of how the app would work before drawing the lofi prototype; look at the functions carefully

-can use colour pencils

-no need to show all scenarios, just a couple will do

* Based on the lo-fi prototype emailed to you, carry out a rule-by-rule usability evaluation of the design. For each rule:

o Discuss, with elaboration, if and how parts of the design implement the rule, or break it, stating clearly which specific parts you are referring to. If certain rules aren’t relevant to the design, explain how so.

o Give constructive and clear suggestions how the design may be improved for that particular rule, and justify why they would help.

Do submit a write-up with nine headings:

o One heading for each of the 8 Golden Rules, and a last heading titled “Additional Comments”.

o The write-up cannot exceed 2 A4 pages. The font that is used should be at least 10 points in size, with reasonable page margins of about 1 inch.

-Upload your submission in **pdf** file format to the NTUlearn site using the appropriate link.

Rubrics:

-Correct understanding of Golden Rules.

-**Specific** nature of critical comments; aim to critique specific aspects of the design instead of just general and vague comments

-Quality of **suggested improvements**. Are your suggestions appropriate, and are they well- justified? Are they specific to the design (good), or are they generic to all designs (not so good)?

-Clarity of report. Did you write your report clearly, using good language?