**Development Strategies**

Agile:

Stakeholders:

1. Teacher

Teacher supposes to use this software to help explaining particle filter for academic purpose. Main requirement of this system is visualizing the output of the algorithm. Before the visualization, teacher will be able to set the parameters of particle filter, then the algorithm will run in the background based on Bayes theorem. (Reference – Bayes theorem)

1. Student

Students require same functions as teacher and suppose this software providing data import/export functions. By those functions they can compare output of the algorithm of different parameters, by both data and visual image. Those functions can also be used to submit the output to teacher if required.

Techniques:

As this software is designed as an academic teaching tool and might run on school’s or users’ own machine, we are supposed to choose techniques available to develop light-weight and cross-platform PC application.

The realizability of data visualization and algorithm computation is the basic requirement of technique choosing.

Learning cost and whether suitable for cooperative development will also be considered as the develop group is supposed to learn and develop as a team.

Plan & Task Assignments:

For this group project, as it is based on complex mathematical knowledge, two members will mostly focus on the realization of the algorithm, including the implementation of the algorithm in background code and related documents. （Cong Liu & Kaiwen Zhang）

One member is responsible for choosing developing techniques, including developing language, framework and tool components. He is also supposed to set up the software development framework and help other members building the develop environment and solve technique problems in developing. (Hejia Qiu)

One member will cooperate with the former one to develop the software, both in design an d code, and supposed to complete some functions and test work. Prototype and interface design is also supposed to complete by this member with the technique chooser. (Xiang Zhang)

As this group project requires meeting and documents, one member will work as documenter to record meeting minutes and necessary documents, both for developers and users. (Zexi Song)

Schedule:

09.28

Hejia Qiu shard how to use Git GUI and Github in the group then the whole group learned how to use git to develop and version control.

10.13

We have the first formal meeting with supervisor Dr.Liang Dai and he provide us some basic reading materials and give guidance on math.

10.13-10.18

We keep learning with existing material and guidance, try to understand how Sequential Monte Carlo works.

10.18-10.30

We find MATLAB code of particle filter and use different pairs of parameters to understand how them works in a visible way. Cong made considerable progress here and explained to group members.

10.30-11.14

During the former meeting we decided to divide into two small groups, one for algorithm (Cong, Zexi) and another for software design (Hejia, Xiang, Kaiwen).

Every small group can focus on their work and that is an efficient way. Software design contains software positioning, requirement confirmation, programming language choosing and function & UI design.

11.14-11.23

We designed the software prototype in detail together with the understanding of algorithm. Kaiwen leaded the team finishing the requirement document.

11.23-12.07

We gathered together for interim group report writing and communicated about software design in detail. Xiang provided the first draft of prototype.

12.07-01.10

Hejia tried several develop frameworks and showed in the group to compare advantages and disadvantages. Cong made progress on algorithm and Kaiwen, Xiang and Zexi keep completing software design.

01.10-2.28

Discuss which language should be used to develop our project. Decided to use an open source framework on Github - “Electron”, which is based on Node.js technique.

During those days, group members started reading relative documents and download examples to learn project structures. Hejia also helped all members to build develop environment.

2.28-3.6

Based on former technical selection work, the group decided to use those two develop tools: Electron-Vue and Electron-Builder.

Electron-Vue is based on Vue.js – a popular opensource front-end framework to make software structure as components. Electron-Builder is an efficient software packaging tool for Electron based on webpack and npm.

We had made tests to ensure those two frameworks works as we expected.

3.6-3.13

Echarts.js, a data visualization framework by Baidu, is chosen by the group for chart drawing on GUI. Hejia learned Echarts.js, made some demos and discussed with Cong and Kaiwen, made sure this framework can satisfy all requirement of the algorithm.

3.13-3.20

Cong wrote algorithm in Python based on former MATLAB reference and math knowledges. We discussed the efficiency and user cost of adding Python environment into the install package.

Hejia and Cong made the demo based on Electron-Vue and the group made details assign.

3.20

Detailed assign each person’s task.

Hejia QIU: Software structure, data visualization and image processing functions.

Cong LIU: Core algorithm complement and MATLAB algorithm transformation.

Kaiwen ZHANG: Repetition algorithm from MATLAB to JavaScript with Cong.

Xiang ZHANG: Write menu bar and complete data import/export functions.

Zexi SONG: Minutes of meetings and related documents of the software.

3.21-3.27

Xiang finished the first draft of menu bar without I/O functions.

Hejia reset the software structure for decrease develop cost and import the chart component into the software then set basic window parameters.

Cong and Kaiwen fixed some bugs of the algorithm with the help of supervisor and finished the first draft of algorithm on JavaScript.

3.28-3.31

Optimized former functions and fixed bugs.

4.1-4.4

Cong added data store function in software.

Hejia finished first draft of interface and completed interactive function.

Xiang updated I/O functions on menu bar.

Zexi finished part of documents.

4.7

Hejia import Bootstrap-Vue component for improve UI.

Xiang fixed type error in importing data with the help of Cong and Hejia.

4.8

Xiang organized the group to have final test together.