

Portfolio

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Home page: <https://quangbk.github.io>

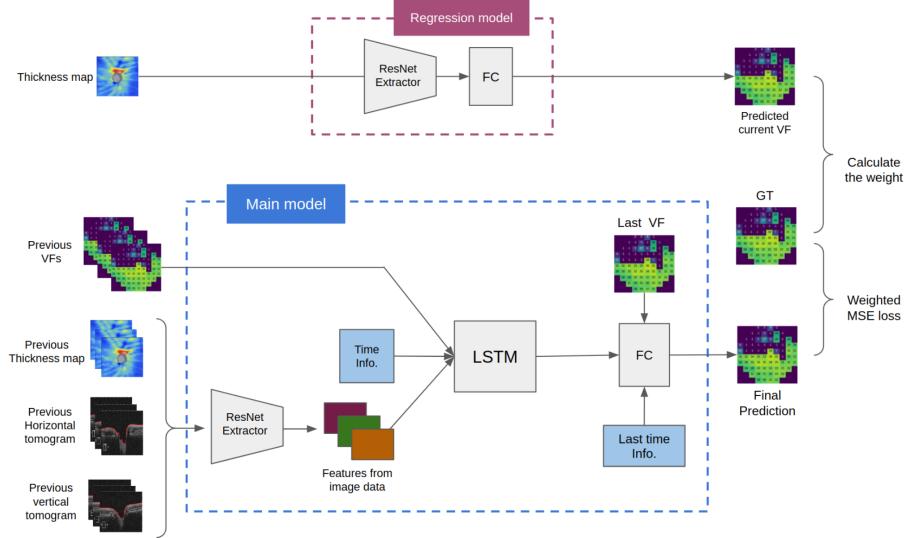
Github: <https://github.com/QuangBK>

Medium Blog: <https://gartist.medium.com>

1 Future visual field prediction

- Propose a framework to predict the visual field for glaucoma patients.
- Combine CNN and LSTM models to deal with multimodal.
- Deal with limited and missing data: propose a new loss function and a new learning scheme.
- Paper: “Multimodal Deep Learning Model of Predicting Future Visual Field for Glaucoma Patients” and “Visual Field Prediction with Missing and Noisy Data Based on Distance-Based Loss”.

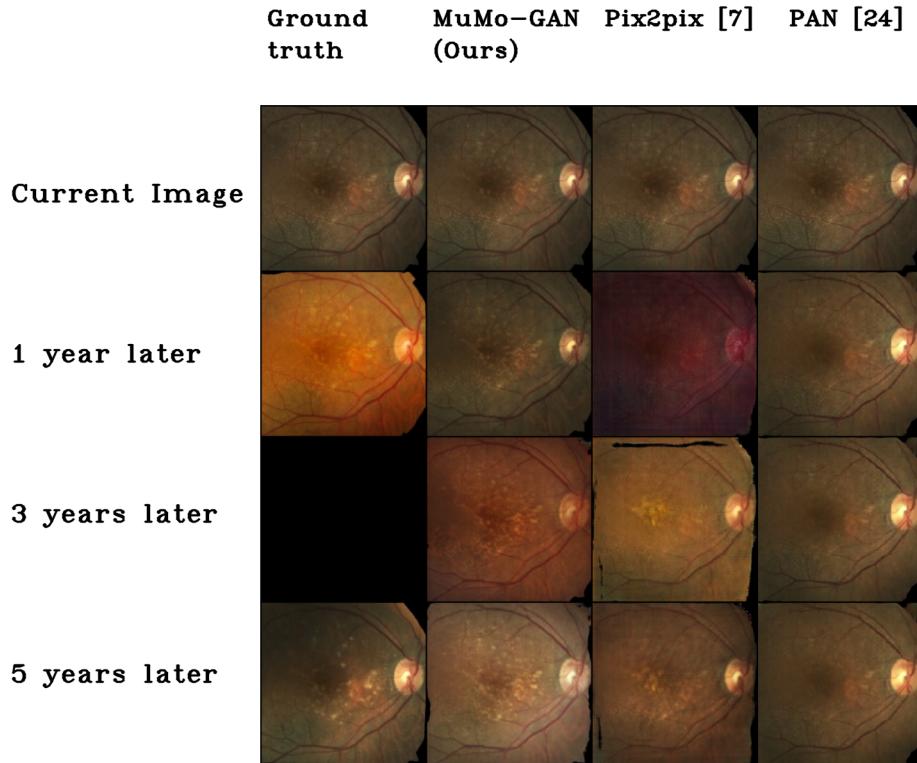
Figure 1: Overview of our framework: a combination of CNN and LSTM.



2 Future fundus image prediction

- Propose a framework to predict future fundus images for AMD patients.
- Combine the GAN model for image generation and the segmentation model for Drusen detection.
- Paper: “[Generating future fundus images for early age-related macular degeneration based on generative adversarial networks](#)”.

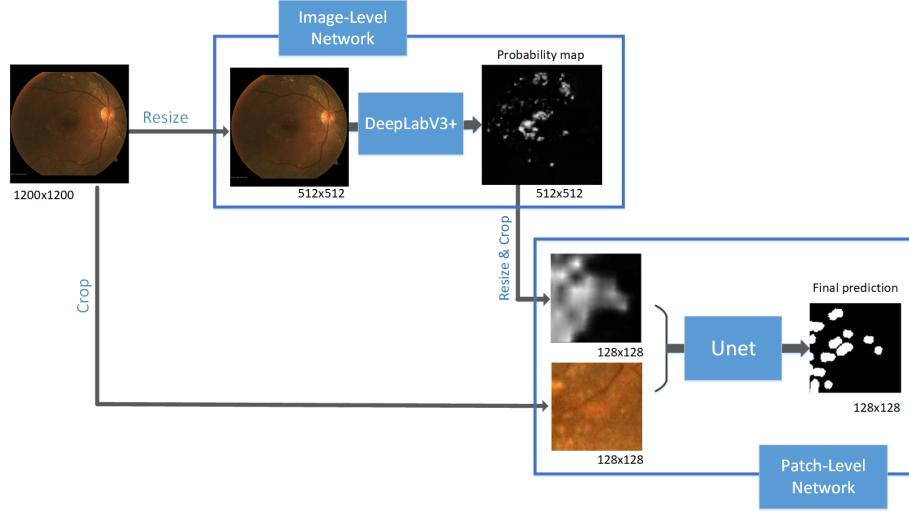
Figure 2: Future fundus images generated by our method and compared methods.



3 Drusen Segmentation

- Propose a framework to detect drusen in high-resolution fundus images for AMD patients.
- Introduce a multi-scale network to exploit global and local information.
- Paper: “[Automatic Drusen Segmentation for Age-Related Macular Degeneration in Fundus Images Using Deep Learning](#)”.

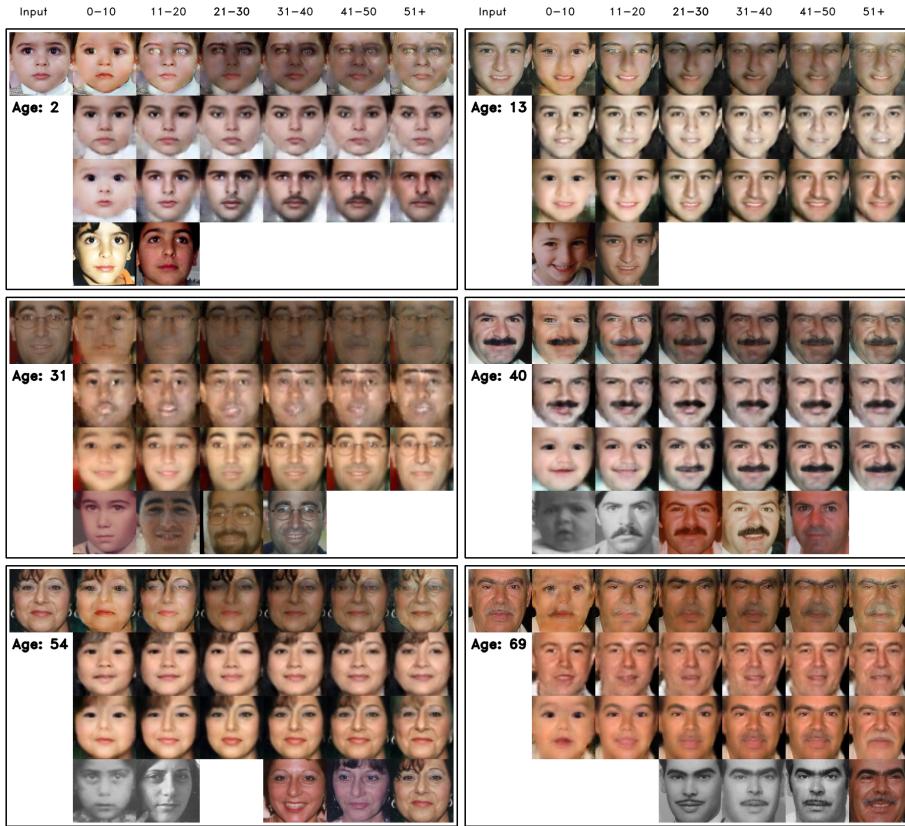
Figure 3: The proposed multi-scale model for drusen segmentation.



4 Face aging with StyleGAN

- Propose a framework for the face aging task: predict the future/past of the human face.
- Introduce a semi-supervised method.
- Using Conditional StyleGAN and a proposed GAN to deal with unpaired datasets.
- Paper: “[Semi-Supervised FaceGAN for Face-Age Progression and Regression with Synthesized Paired Images](#)”.

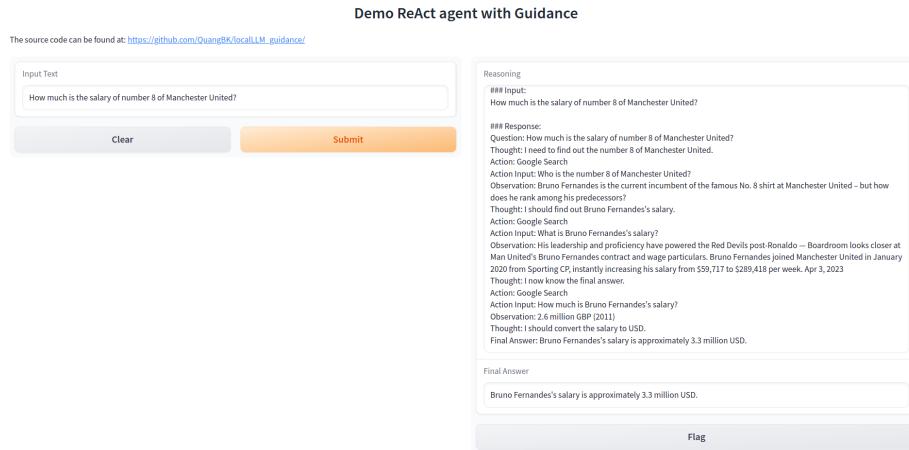
Figure 4: Comparison between our method and others.



5 Automated chatbot with Tools

- Develop a ReAct agent: chatbot and QA agent with Large Langue Models.
- Interact with humans, looking for knowledge from search tools for answering questions.
- Optimize with small LLMs (Vicuna 13B, WizardML 7B, etc.).
- GitHub repository: https://github.com/QuangBK/localLLM_guidance.
- Blog: “[A Simple Agent With Guidance and Local LLM](#)”.

Figure 5: Demo of our chatbot.



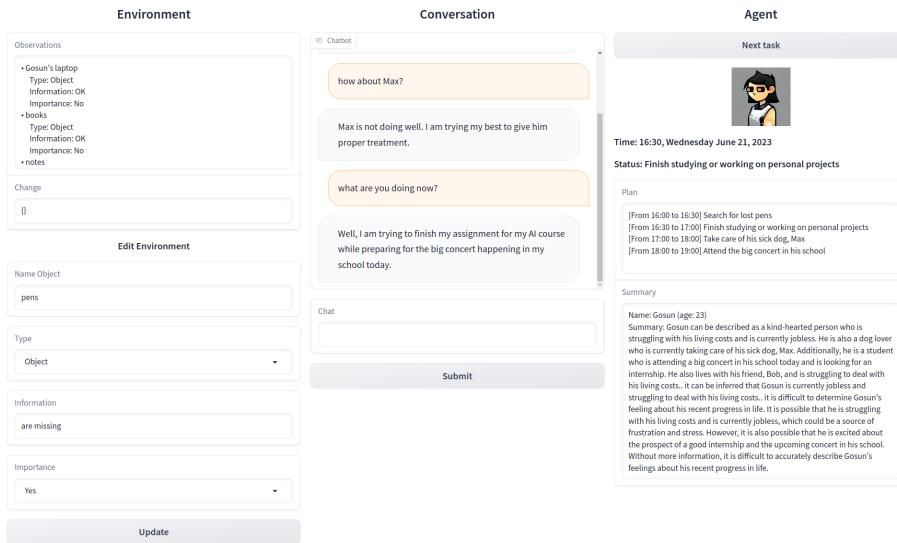
6 Generative Agent and Environment

- Develop a complete simulation world with both automated agents and environments.
- Optimize with small LLMs.
- Generative agents: can think, make plans, act, and react to the environment. Can be NPCs in “The Sims”.
- GitHub repository: https://github.com/QuangBK/generativeAgent_LLM and <https://github.com/QuangBK/GenerativeVirtualWorld>.
- Blog: “[Implementing Generative Agent With Local LLM, Guidance, and Langchain](#)”.

Figure 6: Generative agent.

Generative Virtual World

The project of interaction between generative agent and generative environment. We develop a generative stateless environment with LLM. Provide a open virtual world to test autonomous agents.
The source code can be found at: <https://github.com/QuangBK/GenerativeVirtualWorld/>



7 Semantic preservation for Image editing (Ongoing project)

- Based model: Stable Diffusion model.
- Try to control the semantic information with text conditions.

Figure 7: Comparison between our method and others.

