Flowchart Secretary
Qian Yu, Rao Zhang, Tien-Ning Hsu, Zheng Lyu
Department of Electrical Engineering, Stanford University

Motivation
Flowchart is an ideal way to explicit our thoughts. However, drawing up a well organized flowchart can be SUPER time consuming. In that sense, it would be convenient if we can automatically generate the flowchart template. Here we made it become true! A easy mobile app for people to convert handwritten flowchart into electronic version.

Methodology
A. Component Extraction
Critical component, for example the rectangles, diamonds, circles and arrows are separated, extracted and classified. The original flowchart will be decomposed.
B. Component Labelling
Label and mark each component in order.
C. Component characterization
Use parameter to determine the position and size.
D. Graph Construction
Determine the connection relationship for components and construct output graph.
E. Android Implementation
Develop an app that can be used on Android device.

Overview of Algorithm
- Input flowchart
- Binarize
- Fill Denoise
- Hough transform
- Decompose
- Edge recover
- Android implementation
- Reconstruction
- Connection relationship
- Characterization
- Classification

Experimental Results
- The product is implemented in Android device for users’ convenience. Image processing algorithm is all developed by Java with OpenCv for compatibility.
- Real-time conversion is achieved. Multithread is implemented in Android Studio to guarantee great user experience.
- Fitting parameters can be tuned dynamically by users for enhanced flexibility.