



Erasmus
Mundus

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Enhancing A Therapeutic Mobile App Through Continual Learning And Automated Conversation

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INTRODUCTION & OBJECTIVES

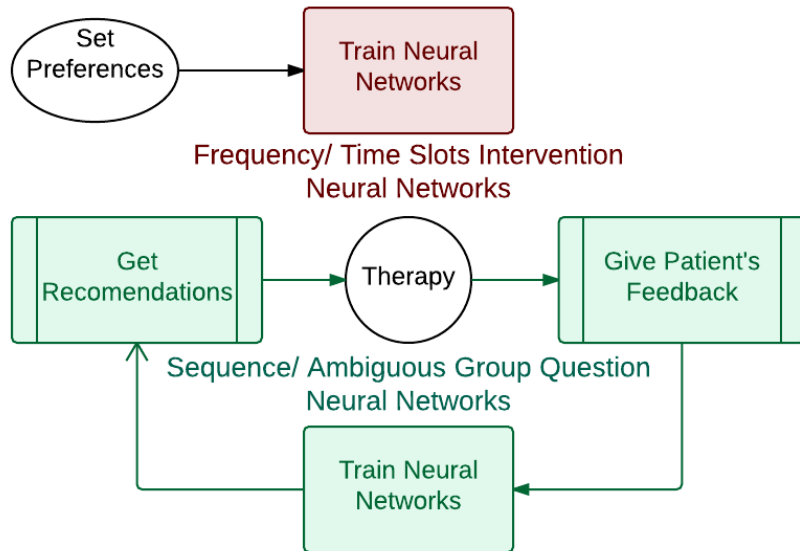
The main objective of Cognitive Behavioural Therapy (CBT) is to treat depression, anxiety disorders and chronic fatigue syndrome. The app developed here is to provide such therapy using automated intervention and conversation through a mobile app.

- ◆ To enhance the performance of neural networks interacting with patients
- ◆ To model a more effective conversation automation script reacting to patients
- ◆ To implement an app into a directly executable form

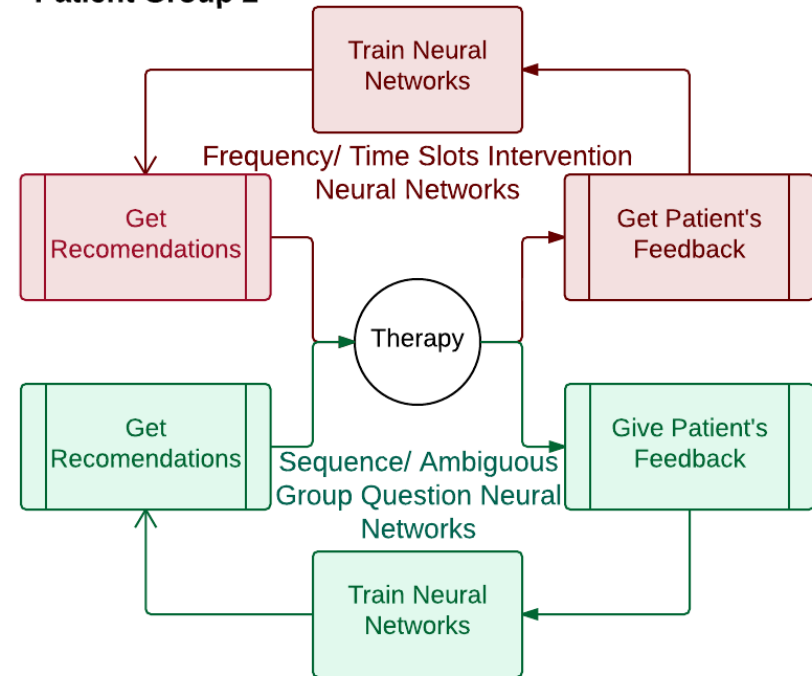
NEURAL NETWORKS

Training Flow

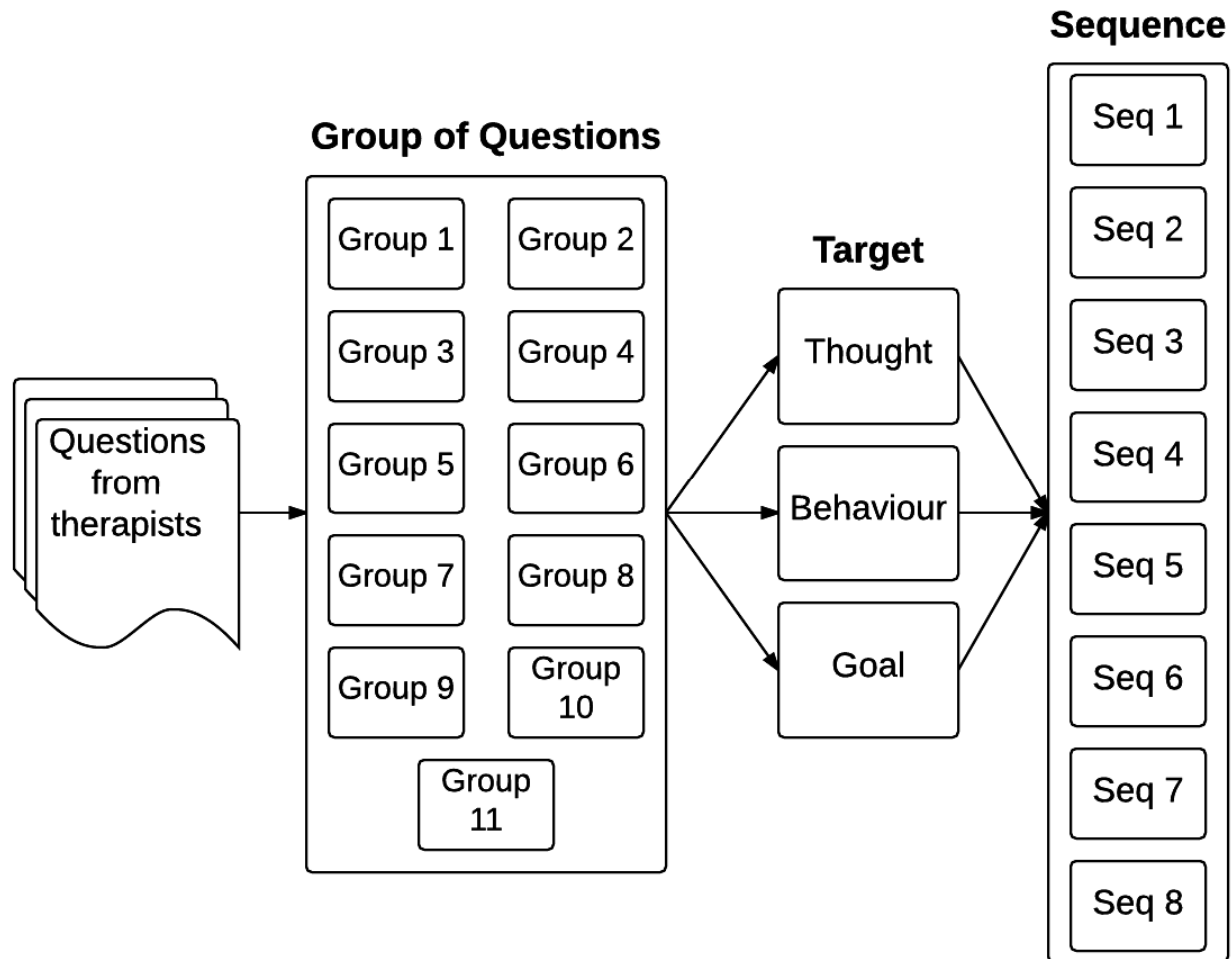
Patient Group 1



Patient Group 2



THERAPEUTIC CONVERSATION



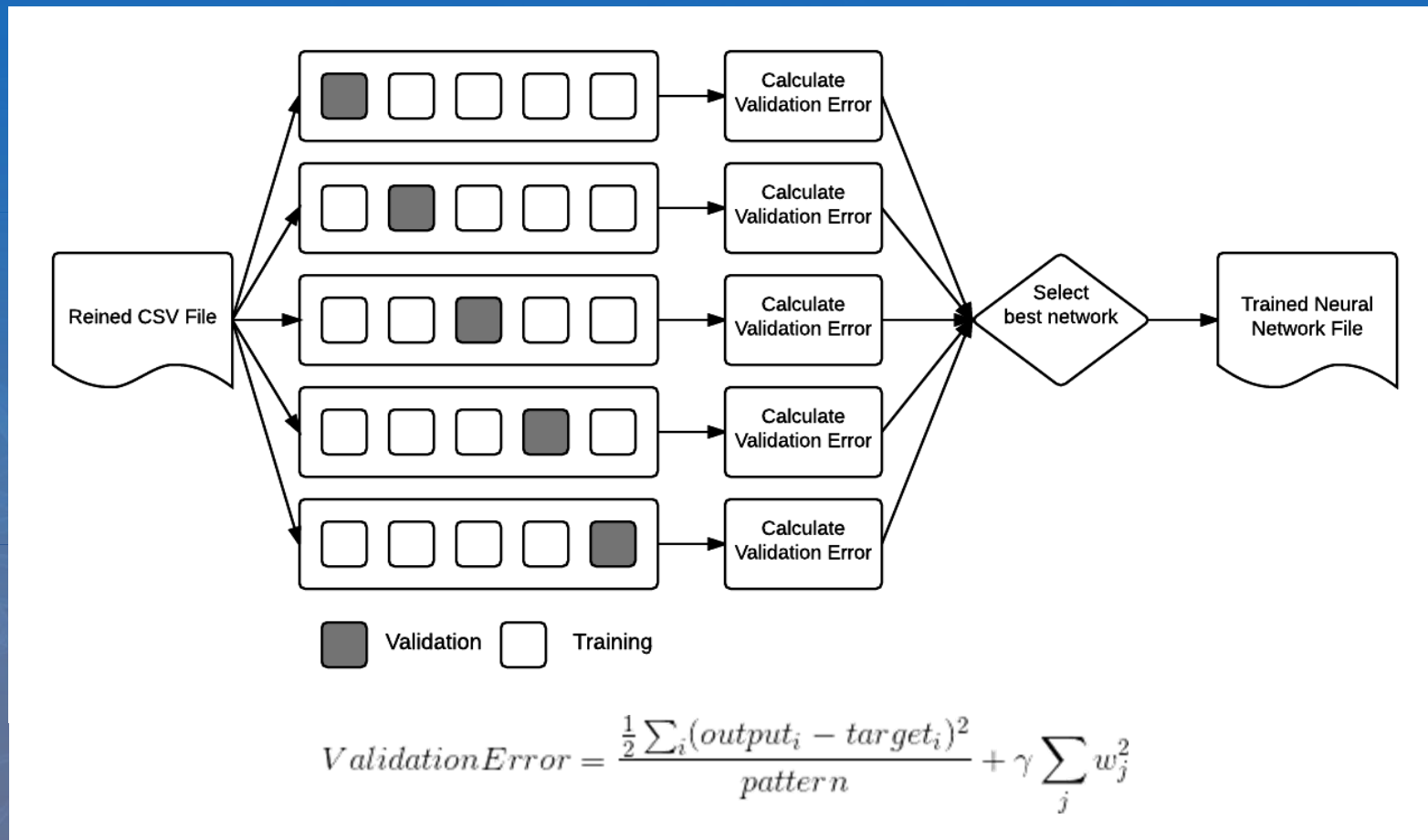
IMPLEMENTATION

Application Overview



IMPLEMENTATION

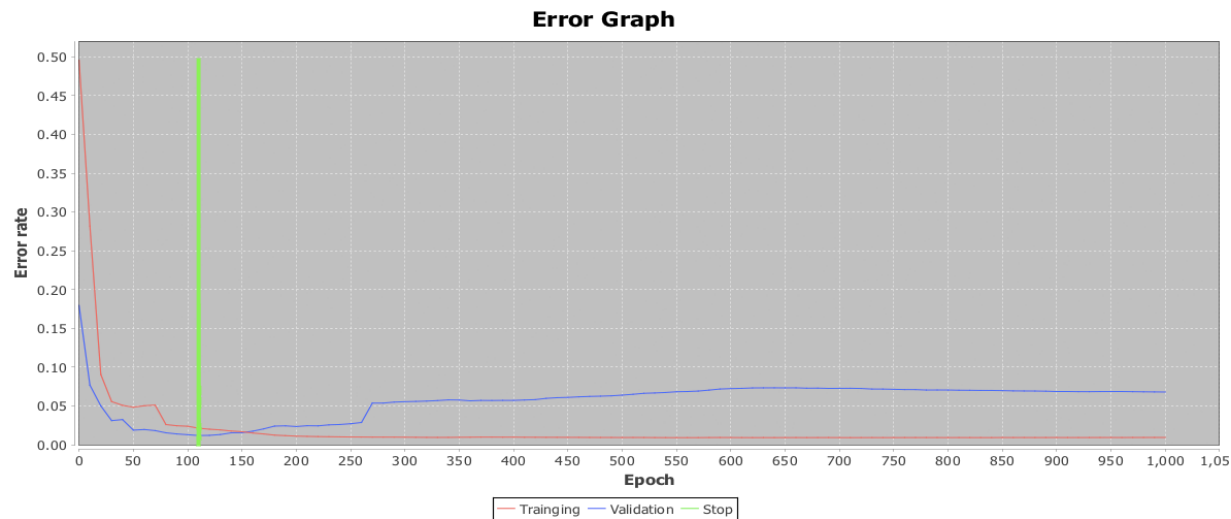
Generalisation relying on Cross-Validation



EVALUATION

Generalisation

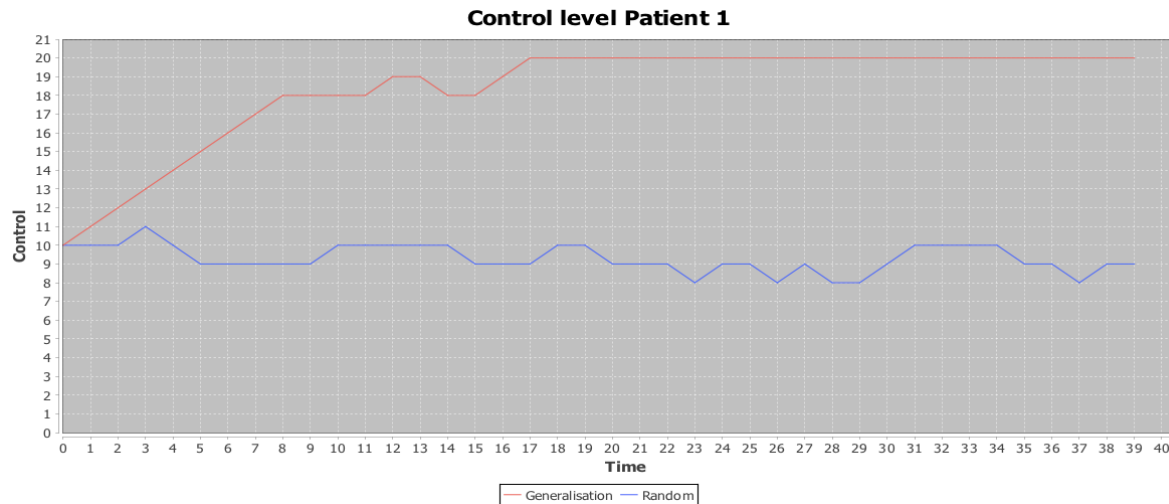
- ◆ It is the goodness of performance of the net on unfamiliar data in this CBT project such as that from patients at a new stage in therapy, or new patients.



EVALUATION

Simulation on Artificial Patients

- ◆ An artificial agent whose control level responds to random and learnt neural recommendations differently indicates that therapy with the neural recommendations tends to increase patient control level with a significant speed.



COMPARISON TO PREVIOUS WORK

- ◆ Intervention system reacts with only the user's preferences.

- ◆ The neural networks are trained without attempting good generalisations.

- ◆ There was only a simple and crude script to automatically guide a conversation.

- ◆ The Android app is only built in development form.

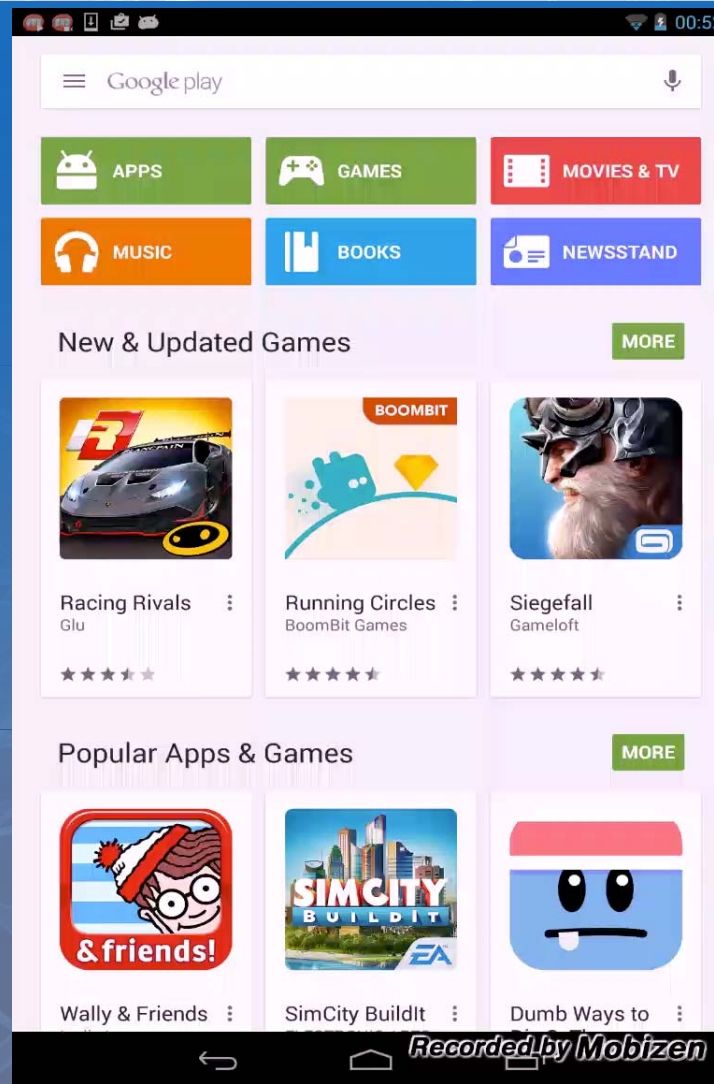
- ◆ Intervention system reacts to both the user's preferences and the user's feedbacks to received neural recommendation.

- ◆ The neural networks are trained using generalisation techniques relying on cross-validation.

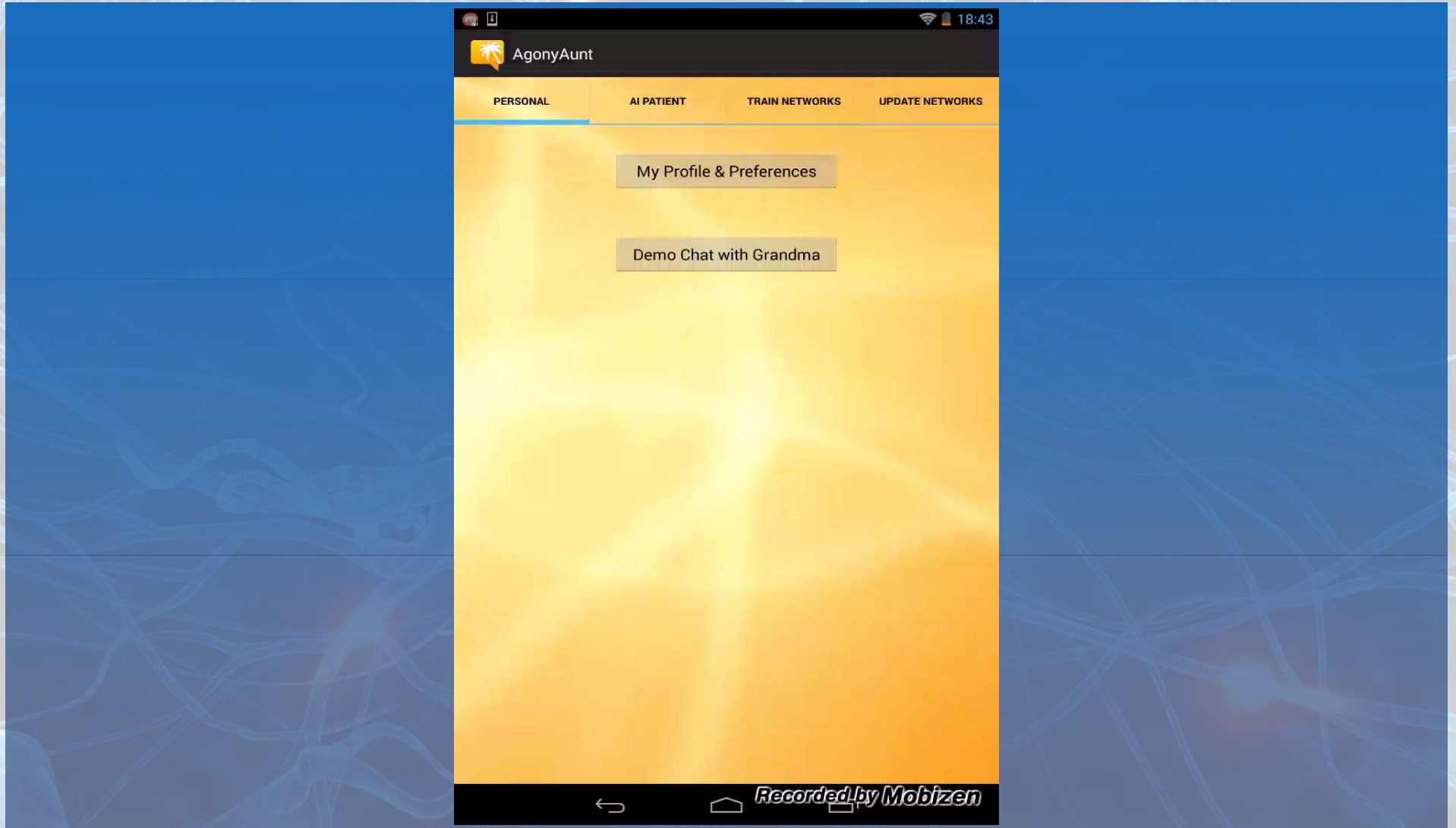
- ◆ Conversation is guided by a varying sequence of questions tailored to the patient

- ◆ The Android app is built in directly executable form and published on Google play.

DEMO



DEMO



DEMO



DEMO

How are you travelling just now?

I am thinking about
my final project

Speak to you

Next

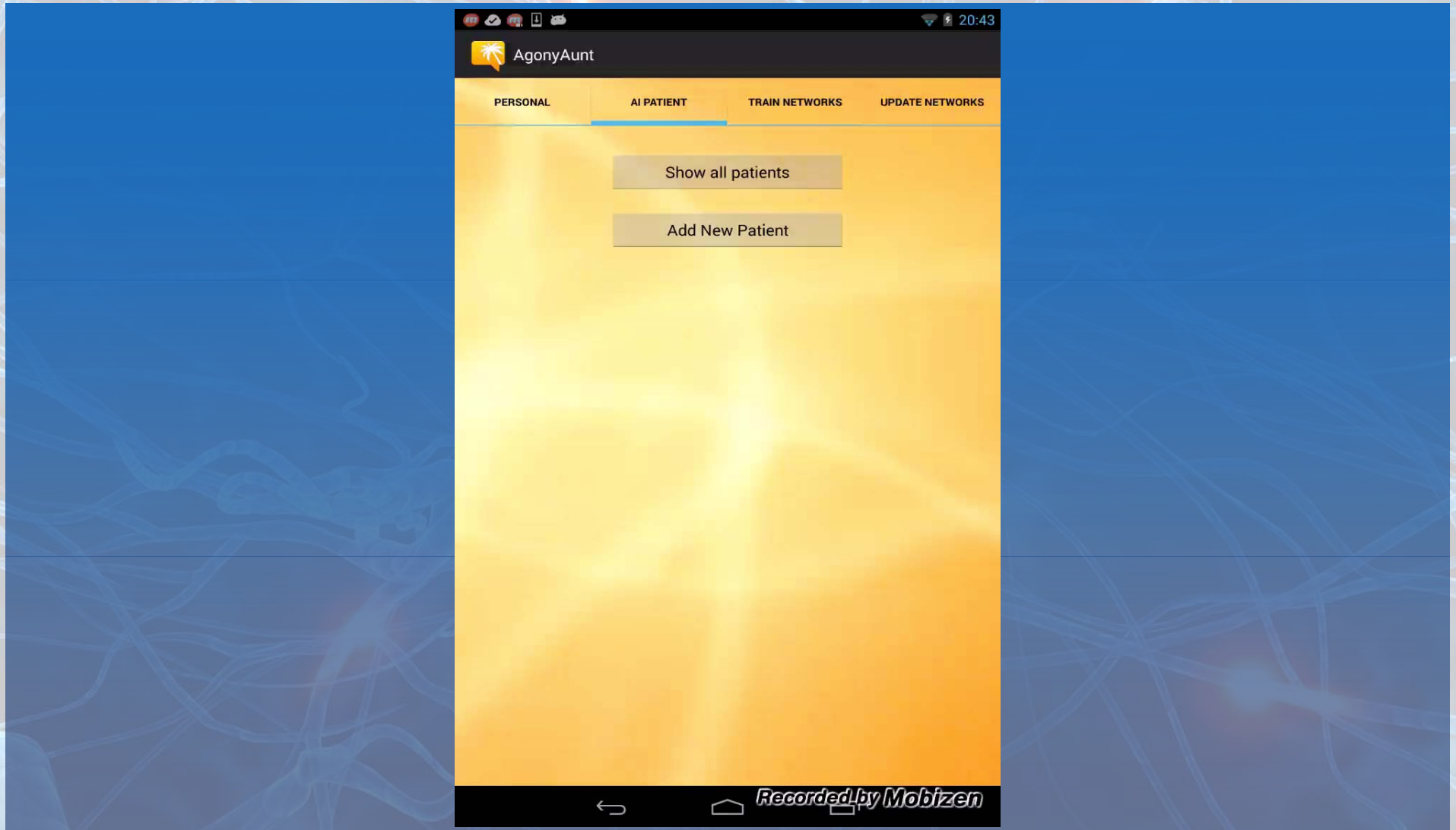
What is running through your mind as you think about your final project?

Enter your answer

Speak to you

Next

DEMO



CONCLUSION

- ◆ Extendable neural networks used to produce recommended interventions and therapeutic conversation are trained with generalisation techniques for dealing with the unfamiliar data.
- ◆ The therapy questions have been designed to be comprehensive in extracting target data from the patient in a conversational and interactive style.
- ◆ Simple artificial patients are simulated to indicate the variable rates at which the control levels of patients may increase with therapy.
- ◆ The android application is generated in a directly executable form and published on Google play.

FUTURE WORKS

- ◆ Cooperate with psychology and psychotherapy professionals to ready the App for trials with real patients.
- ◆ Further enhance performance of the neural networks as well as the therapeutic conversation
- ◆ Automatic training and updating the neural network is required
- ◆ Improving the user interface to support the inexperienced user/patient
- ◆ Achieve all core quality test procedure from Google Play



THANK YOU

Q & A