# Thesis Proposal: Summarization of Motivational Interviewing-Style Chatbot-Patient Smoking Cessation Conversation Using Transformer-Based Neural Networks

## Background & Significance

In 2020, one in ten Canadians were smoking cigarettes, with 80% of the smokers consuming cigarettes daily [1]. Nicotine within cigarettes results in a highly addictive process, comparable to opioids and cocaine resulting in difficultly breaking such a habit [2]. However, counselling individuals struggling with addiction has been shown to aid in effects to quit [2]. Specifically, cognitive behavioral therapy (CBT) an umbrella term which encapsulates a framework for counselling has demonstrated efficacy in addiction treatment [3][4]. This proposal focuses on Motivational Interviewing (MI) a subset of CBT. MI focuses on engagement and evocation of a patient's intrinsic motivation to promote behavioural change [4].

The proposal builds off existing work done by Professor Jonathan Rose's research group who have developed a deep learning (DL) chatbot to help individuals struggling with cigarette addiction [5]. Currently the chatbot asks five static questions and responds to user answers though reflective follow-ups in line with the MI framework [5]. The goal of this endeavor is to develop this chatbot as an automated talk therapy which may help reduce smoking addiction. However, there area components within MI that has yet to be incorporated into the chatbot.

## Problem

A key component of MI is summarization of the progress made between the counselor and patient [6]. Doing so allows the counselor to pull together points from a broader conversation and establish a clearer picture for the patient. This can also help reveal new insights through its' juxtaposition of information covered throughout the session [6]. While text summarization has been done successfully through DL, summarization within the context of behavioural counselling has not been explored [7]. Implementing this feature within the existing chatbot would likely further improve its effectiveness.

## Objectives

The goal of this thesis is to develop a DL-based summarization model that takes a transcript between the chatbot and the user and provide a summary from the narrative perspective of the chatbot. The summarization should be in-line with MI and aim to convey compassion, collaboration, acceptance, and evocation, the four core components of MI [6]. Additionally, the summarization should also aim to offer reflection of the prior conversation and thus perform abstractive summarization, which generates new sentences in the summary rather than extract sentences from the input [8].

## Approach & Methods

To achieve such a solution, GPT3's zero shot text summarization will be explored which has been shown to be highly effective at this task [8]. Leveraging zero shot will also allow the design of a pipeline of GPT3 modules each with a different prompt, each module further improving the summarization quality.

**References**


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