

# Emotion Intelligence Enhancement and Improvement for People with Autism

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**Abstract**—Autism was introduced in the twenties century specifically in 1944. Autism is defined as a development disorder that affects the social skills, nonverbal communication or what is known as body language. Children with autism have communication troubles. They have trouble to understand what other people think and feel. As a consequence, it makes them very hard to express themselves by any other means. People with Autism tends to have high IQ but very low EQ. In addition, one who suffers autism tends to have a specific routine, aggressive response when changing this routine. The Proposed Idea is to develop a computer algorithm/methodology for increasing emotional intelligence. The aim of the proposed idea is to help people with Autism that tends to have below average EI to seek normality. The program will use the high IQ of the user to increase his/her EQ. To achieve this, it is intended to develop a program that refuse any miss behavior, or inappropriate attitude. The developed program acts like human, who will not accept to be treated in a specific way. To increase ones EI, people with autism should be trained on: How to deal with people in a way they would accept, how to understand his/her emotion and accept it, and how to express their emotions. The aim of the developed program is to help autism users accept people and be selves accepted. The program should instruct user the program should instruct user how to make friends in the real life.

**Index Terms**—autism, IQ, EQ, E-therapy

## I. INTRODUCTION

In 2017, the number of people with autism in Egypt is estimated at 800,000, according to the Social Solidarity Ministry. One in every 160 children shows signs of having this mental condition and the rate among men is times that recorded in women [1] and [2].

According to NAMI (National alliance on mental illness), one in five adults suffer from mental illness in the United States of America. It means about 43.8 million Americans suffer a mental illness [3] and [4]. Also in the United Kingdom one in four people tends to have mental disorders and about 17% of Scottish women and 14% of Scottish men suffer a mental illness [5]. In 2008 Victorian Department of health funded the SMART (self-

management and recovery technology) research program [6]. It focuses on E-Therapy bringing up the idea of treatment programs via internet. Patients, parents and therapists, can use these programs. The E- therapy research unit established the National E-Therapy Centre (NeTC) in 2008. A person with Asperger's syndrome experiences the world in a very different way. With a tendency to take conversations and events literally, the emotional subtext often is unseen. This can lead to behavior that appears inappropriate at best, heartless or cruel at worst [7]. Emotional Intelligence EI is defined as the capability to classify, control, and evaluate ones emotion. There are two types of emotional intelligence. The first is ability EI (cognitive emotional ability). The second is trait EI (trait emotional self-efficiency). The difference between them is, that the first can be measured and tested and is more related to the cognitive ability [7]. The second is more related to how one measure himself, and how capable he/she is in expressing their emotions, handling themselves, and others emotions. [8] People with Autism, and Asperger's syndrome tends to have a severe low average EQ. Which prevents them from dealing with people, making friends, forming a family, etc. [9]. There are many therapists, institutes, private schools, that helps people who suffer from mental illness. In the development countries children and adults with mental illness tends to be treated inappropriately. Furthermore, not all parents are capable of sending their children to a private school, university and institutes. That is why E-therapy or software are needed to help people who cannot afford a therapist. As autistic people tends to suffer from high irritation with severe reaction when their daily routine is changed [10]. Some games where provided for people with autism such as the online game Ron gets dressed, which shows the user/patient that it is fine to change your daily routine [9]. In addition, people with autism are defined as selfish. This attitude can be used against them as they see themselves as the only ones that matter. Available software that intend to help disable users, indirectly provides the assistance and guidelines for people with mental illness. It shows them how other normal people behave and act during their daily life [11] and [12]. These guidelines help them to communicate, make friends, and increase their self-

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confidence. In addition, such guidelines will allow them to participate and have a role in their society.

## II. REVIEW AND BACKGROUND

Emotional intelligence, in a very broad sense, refers to how well a person is able to identify and assess the emotions of other people, and to recognize and manage their own emotions. Research have shown that helping people with disabilities express emotions and recognize emotions in others is tremendously beneficial for my clients. Their ability to communicate their needs and, more importantly, get their needs met, increases significantly when they are better able to recognize and identify and talk about their own feelings. There are a lot of ways that persons with disabilities can learn to identify and express their emotions.

The authors in [12] explored the performance of young adults with Autism Spectrum Disorder (ASD) without an accompanying intellectual or language disorder relative to typically developing peers, on indices of CI and EI. These findings also highlight the need to address not only the intellectual aspects of cognition, but also the emotional components to increase understanding of, and improve treatment for individuals on the autism spectrum. This understanding would enhance the ability to assess and support young adults with ASD, and ultimately ease their transition into adulthood.

The author in [13] has carried out a small-scaled qualitative pilot study, using a multiple case-study design, with three primary mainstream schools within the West Midlands to explore how emotional understanding is taught to pupils with autism. Research questions focused on identifying strategies and/or programmes utilized to teach emotional understanding and priority areas for teaching. Data was garnered from interviews and documentary analysis of teaching resources. Findings indicated that emotional understanding was mainly targeted through whole classroom approaches, the Social and Emotional Aspects of Learning (SEAL), or Promoting Alternative Thinking Strategies (PATHS), and through mixed small-group social skills programmes.

The authors in [14] has introduced a theoretical framework explaining how trait EI, ability EI, and emotion information processing may contribute to effective emotion-related performance and provide initial evidence supporting its usefulness in predicting EI-related outcomes. More specifically, they show that performance in a task in which participants had to infer the mental and emotional states of others, namely a Theory of Mind task, was predicted jointly (e.g., interaction effects) by trait EI, ability EI, and emotion information processing, after controlling for personality and IQ (N = 323). Their results argue for the importance of investigating the joint contribution of different aspects of EI in explaining variability in emotionally laden outcomes.

Emotional intelligence (EI) has emerged as a relatively new explanation for social difficulties in typically developing individuals. Recently, researchers also have

demonstrated that EI predicted important social outcomes for individuals with Asperger syndrome (AS). The authors in [15] explored EI as an alternative or additive explanation for the social deficits observed in young adults with AS in light of the two predominant theories accounting for social difficulties. Implications for practice are discussed.

Children with Autism Spectrum Conditions (ASC) have major difficulties in recognizing and responding to emotional and mental states in others' facial expressions.

Such difficulties in empathy underlie their social-communication difficulties that form a core of the diagnosis. The authors in [16] have investigated whether aspects of empathy can be taught to young children with ASC. They review a study that evaluated *The Transporters*, an animated series designed to enhance emotion comprehension in children with ASC. Children with ASC (4–7 years old) watched *The Transporters* every day for four weeks. Participants were tested before and after intervention on emotional vocabulary and emotion recognition at three levels of generalization. The intervention group improved significantly more than a clinical control group on all task levels, performing comparably to typical controls at time 2. The discussion centres on how vehicles as mechanical systems may be one key reason why *The Transporters* caused the improved understanding and recognition of emotions in children with ASC. The implications for the design of autism-friendly interventions are also explored.

## III. METHODOLOGIES

As Mentioned in the above, there is no program yet for people with low EQ, but there is computer games implemented not to increase the EQ but to help the user to cope. On the other hand, some institutions, and researches recommends some methodologies that one can use to increase his/her EI [17] and [18]. Also there are websites that provide EQ Test. In this section we will discuss some of the methodologies currently used, suggest an improvement/ integration. Theoretically, there are five important methods to improve your EI [3],

1. Focus on your emotions
2. Improve your body language skills and recognize that of others
3. Exercise empathy
4. Practice self-direction
5. Increase your social skills.

Professor Emeritus of Psychology at UCLA, Â Albert Merhabian, states that:

1. 55% of our correspondence is absorbed from non-verbal communication, Such as body language.
2. While 38% is para-etymological (doing with the way that you say something: tone, delays, pace, and so on) and an insignificant 7% relates to the genuine words talked [10].

Dr. Jeanette McAfee, author of the curriculum, *Navigating the Social World: A Curriculum for*

Individuals with Asperger’s Syndrome, High Functioning Autism and Related Disorders, has created this five step process to help children with mild autism and Asperger’s 1) recognize and label their own positive and negative emotions, and 2) help them understand nonverbal, tone of voice, and situational clues to feelings. [11]

To conclude, non-verbal communication is the most capable segment of how we impart [10]. The Methodologies used in computer games are based on normal gaming algorithms [9], that allows the user to see changes, accept its existence, and cope with it [19].

#### IV. PROPOSED IDEA

The proposed Idea is a program that preforms an EQ test, detecting points of weakness and strength. The above five methodologies in Fig. 1 will be used to train the user. The developed program provides training on how to act in specific situations. Moreover, the developed program trains the user to learn how to behave, and how to act according to the way the program is repetitively proposing. Thereafter, the program will perform an EQ test repeatedly until the user reaches the normal EQ rates. The goal of this project is to test the Emotional intelligence using EQ tests. The program detect emotions using face detection and check the attitude of user. The program trains the users on how to react in specific conditions. In order to gather measurable information and build up an information base for disable people.



Figure 1. Five way methodology [20]

As mentioned above the developed program should:

1. Scan the user’s face
2. Analyse user’s emotion
3. Recognize user’s voice
4. Detect user’s tune

Here bellow is a sample Pseudo code of the program written in C# for the interactive dialogue that takes place between the computer and user

```

If ( text == "Tell Me a Story " )
{
  System.Console.WriteLine
  ("Please Ask Nicely, For Example Say Please");
}
  
```

```

If (text == "Tell Me a Story, Please ")
{
  System.Console.WriteLine
  ("Narrate a Story");
}
Sample of the program code:
// amy is the name of the avatar
Dispatcher.Invoke((Action)(() =>
{
  Speak.IsEnabled = true;
  Bot mybot = new Bot();
  mybot.loadSettings();
  User myuser = new User("Samaa", mybot);
  mybot.isAcceptingUserInput = false;
  mybot.loadAIMLFromFiles();
  mybot.isAcceptingUserInput = true;
  string inputText = input.Text;
  Request req = new Request(inputText,
  myuser, mybot);
  Result result = mybot.Chat(req);
  Responce.Text = "\r\n" + " Jack: " +
  result.Output;
  Responce.Text += "\n";
  amy.SpeakAsync(result.Output);
  if (mode == "sad")
  {
    amy.SpeakAsync("What is wrong why
    are you sad please show me your
    wonderful smile");
  }

  if (req.ToString() != " ")
  {
    amy.SpeakAsync("Im sorry to hear
    soo");
    // enhanced AI code for the
    answer is under progress
  }
  else
  amy.SpeakAsync("Please smile ");
}
else
{
  if (req.ToString() == "Tell Me a
  Story")
  {
    amy.SpeakAsync("Please Ask Nicely,
    Example Say Please");
  }

  else if (req.ToString() == "Tell Me a
  Story Please")
  {
    amy.SpeakAsync("Story narated by the
    program"); // the program narrates a
    story
  }
}
});
  
```

Same will be implemented in Image Detection

```

If (Emotion == 'Sad')
{
System.Console.WriteLine
("Ask to smile");
}
If (Emotion == 'Smile')
{
System.Console.WriteLine
("Narrate"); // narrate a story
}
    
```

The program has been divided into the following Tasks:

1. Perform an EQ Test, which can be done by connecting the program to a website that performs EQ tests. In the meanwhile, a developed program will perform an EQ test.
2. Perform Emotion detection using Image recognition. This has been achieved using the so-called library Open-CV in Matlab, C#, python, java.
3. Perform sound recognition. This has been done using C# by Microsoft.net library. One could also use java by sphinx. However, it is preferable to use C# or python to increase the Efficiency.
4. Perform text to speech conversion. This could be performed using C# or python. Although efficiency in java is higher if Mobrola (a java program application) is used.
5. Perform the algorithm which uses the above five features appearing in Fig. 1. This will combine the methodologies appearing in Fig. 1 and the Methodologies addressed above for further illustration as an example Fig. 2 provides an explanation.
6. Perform an EQ test again to detect the improvement rates and continue on improving till user reaches normal EI rates.

Here bellow is a brief explanation for the steps illustrated in Fig. 2:

1. User will open the program
2. The user will start dealing with the program
3. The user shows an unfriendly attitude
4. Program detects what was wrong
5. Program asks the user to change attitude
6. User changes his attitude
7. The program narrates a story regarding the user's misbehavior
8. Program will continue dealing with the user first after he changes his attitude.

In point 7 the program reacts like a human. It resamples a situation that the user will face in real life. Therefore, user will learn how to apologize.

The entity "console" in Fig. 2 means that the program will show empathy for the user. Such kind of empathy could be done using different answers, and machine learning algorithm. Which will check its knowledge base to find a suitable answer, depending on the situation.

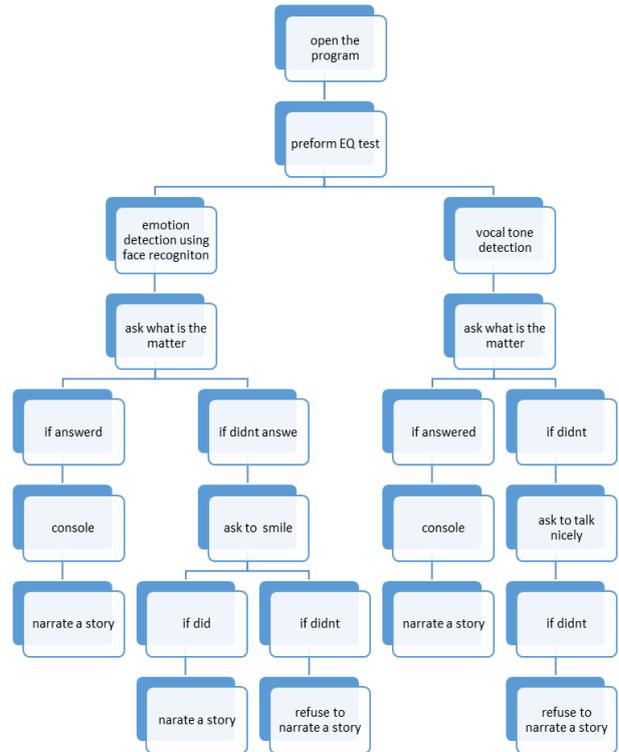


Figure 2. Algorithm used in the application

Here below are some snapshots previewing the accomplished work (voice recognition and question/answers). The preformed conversation between user and program will be posted on the screen as shown in the snapshots below (Fig. 3).



Figure 3(a). Polite answer



Figure 3(b). Introducing emotions like: Loyalty



Figure 3(c). Showing that politeness is appreciated

## V. FUTURE ENHANCEMENT

The program should be further enhanced to be able to self-learn other methodologies. Enhance the EQ test methodologies and the program interface such as voice and sound.

## VI. CONCLUSIONS

The developed program intends to increase EQ of autism users. The program performs an EQ test repeatedly until the user reaches the normal EI rates. The developed program acts like human during the interaction with the autism user. It will not tolerate the unusual or inappropriate attitude or unacceptable reaction of the user. Moreover, it will try to improve user's reaction by repetitively asked questions until the user's answer is satisfactory. Furthermore, it detects user emotions using face detection and check the user attitude. The program trains the users on how to react in specific conditions. And, the program instructs user on how to make friends in real life. The combination of methodologies and the repetitive EQ tests ensures the effectiveness and efficiency of the product.

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