Đại học quốc gia Thành phố Hồ Chí Minh

Trường Đại học Công nghệ thông tin

Khoa công nghệ phần mềm

Xây dựng chatbox sử dụng Machine Learning

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13/06/2019
Version: 1.0

Lời cảm ơn

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Contents

Lịch sử

1.1 Giới thiệu

Công nghệ truyền thông đang tiến bộ rất nhanh. Và ngày nay, hầu hết mọi người thích kết nối thông qua tin nhắn văn bản hoặc ứng dụng nhắn tin. Để làm cho cuộc sống thuận tiện hơn, các tổ chức và ngành công nghiệp đang thúc đẩy truyền thông bằng cách phát triển và đầu tư vào chatbot.

Chatbots là các dịch vụ được lập trình trên máy tính có thể tương tác như con người thông qua giao diện trò chuyện, cả về mặt văn bản và thính giác. Còn được gọi là talkbots, smartbots, bot, chatterbots hoặc tác nhân tương tác, các chương trình này nhằm giao tiếp với người dùng và hành xử như thể một con người thực sự đứng sau cuộc trò chuyện.

Hiện tại, các bot này được tìm thấy trong các giải pháp trò chuyện hoặc nhắn tin lớn như Facebook Messenger, Kik, Slack, WeChat, Line, LiveChat và Telegram. Với sự phổ biến của công nghệ, ngay cả những người hầu như không chú ý đến công nghệ hiện đại có lẽ đã tương tác với các bot này nhiều lần rồi.

Hai loại Chatbots

Chatbots không phải là mới. Tuy nhiên, việc sử dụng các bot đã thu hút các ngành công nghiệp trong vài năm qua. Được thành lập lần đầu tiên vào những năm 1960, chatbot đã đi một chặng đường dài từ sự phát triển ban đầu của nó. Có hai loại chatbot. Loại chatbot phổ biến nhất là dựa trên quy tắc và loại tiên tiến hơn được cung cấp trí tuệ nhân tạo. Các chatbot trí tuệ nhân tạo (AI) sử dụng các hệ thống xử lý ngôn ngữ tự nhiên. Trong hệ thống này, các máy tính được lập trình để đọc, xử lý và phân tích số lượng lớn dữ liệu ngôn ngữ tự nhiên. Các công nghệ trí tuệ nhân tạo cũng bao gồm các thuật toán học sâu và máy học. Các bot AI học hỏi từ các cuộc trò chuyện và tương tác họ có với mọi người, mở rộng cơ sở dữ liệu của họ. Mặt khác, các bot dựa trên quy tắc được tạo thành từ các hệ thống đơn giản và do đó, có các phản hồi hạn chế. Hệ thống quét và xác định từ khóa hình thành đầu vào của người dùng và trả lời bằng lệnh tương ứng. Không giống như các chatbot dựa trên AI, các chatbot dựa trên quy tắc không còn phản hồi khi chúng gặp các lệnh lạ và các từ không được nhận dạng.

Sáng tạo công nghệ

Việc tạo ra các chatbot tương tự như mô hình phát triển các ứng dụng và trang web di động và

ban đầu bắt đầu với thiết kế. Thiết kế này mô tả sự tương tác của bot và người dùng. Mẫu này cũng bao gồm việc xây dựng bot liên quan đến phân tích đầu vào bằng cách sử dụng một công cụ xử lý ngôn ngữ tự nhiên. Sau các giai đoạn ban đầu, phân tích và bảo trì các bot sau đó được thực hiện. Việc phát triển Chatbot có thể được thực hiện trên các nền tảng được cung cấp bởi các nhà cung cấp Dịch vụ Nền tảng. Trong số này có IBM Watson, SnatchBot và Oracle Cloud Platform. Các nghiên cứu gần đây dường như cho thấy mọi người dành nhiều thời gian sử dụng các ứng dụng nhắn tin hơn phương tiện truyền thông xã hội. Do đó, các ứng dụng nhắn tin hiện cung cấp nhiều nền tảng hơn cho các công ty và doanh nghiệp để tiếp cận phần lớn người tiêu dùng. Hiệu quả của chatbot, đặc biệt là các ứng dụng sử dụng AI, lôi kéo và khuyến khích các công ty đầu tư vào các loại dịch vụ này. Sử dụng trong các ngành công nghiệp khác nhau Chatbots có một loạt các ứng dụng trong các lĩnh vực khác nhau như kinh doanh, giáo dục, thông tin và giải trí. Được sử dụng lần đầu tiên trong các trò chơi tương tác trực tuyến và nhắn tin tức thời, các bot này hiện đang được phân loại dựa trên việc sử dụng chúng trong giao tiếp, phân tích, thiết kế, du lịch, thể thao, mua sắm, cá nhân, thực phẩm và sức khỏe. Trong lĩnh vực kinh doanh, nhiều công ty đã sử dụng chatbot để cải thiện dịch vụ của họ và tăng doanh số bán hàng của họ. Từ việc xử lý các đơn đặt hàng trực tuyến đến tiếp thị và dịch vụ khách hàng và hỗ trợ, các bot hỗ trợ và phục vụ nhu cầu của người tiêu dùng bất cứ lúc nào trong ngày, có hoặc không có đại lý trực tiếp. Các hãng hàng không và các công ty thương mại điện tử cũng đã sử dụng chatbot trên trang web của họ để cung cấp thông tin và trả lời các câu hỏi cho khách hàng và khách hàng của họ. Một số công ty cũng đã đầu tư vào chatbot cho các vấn đề nội bộ, chẳng hạn như trong nguồn nhân lực. Các bot có thể hỗ trợ xử lý và bảo mật tài liệu. Các ngành công nghiệp ngân hàng cũng đang đầu tư vào chatbot thay cho các đại lý trung tâm cuộc gọi để phục vụ khách hàng của họ. Hơn nữa, các tập đoàn đồ chơi đang sử dụng đồ chơi dựa trên chatbot. Những thứ này cho phép trẻ tương tác tốt hơn với đồ chơi, cho phép chúng học tốt hơn. Nói chung, việc sử dụng chatbot trong các ngành tạo ra doanh thu lớn hơn trong khi tiết kiệm thời gian và tiền bạc. Họ cũng hướng dẫn người tiêu dùng tìm kiếm những gì họ quan tâm, mang lại cho họ trải nghiệm tốt hơn và độc đáo hơn.

Sự xuất hiện của trợ lý ảo

Chatbots cũng hoạt động như trợ lý ảo. Một số trong số các bot này là những người nổi tiếng mà bạn có thể đã nghe nói về Amazon Alexa, Google Assistant và Siri của Apple. Những trợ lý ảo này có thể thực hiện cả các nhiệm vụ đơn giản và cơ bản, cho phép người tiêu dùng tập trung vào những thứ quan trọng hơn. Những bot trợ lý ảo này giúp mọi người theo nhiều cách. Họ giữ cho người dùng của họ thông báo với các tin tức hiện tại và cập nhật thời tiết. Họ nhắc nhở họ về lịch trình của họ và hỗ trợ họ trong cửa hàng tạp hóa và tài chính của họ. Quan trọng hơn, bot cũng hoạt động như một người bạn và người bạn tâm tình. Ở châu Á, có một quốc gia có bot mà hàng triệu người nói chuyện. Vì vậy, thật an toàn khi nói rằng có vô số khả năng với bot.

Thành phần con người Sự phát triển của công nghệ và sự phát triển của chatbot chắc chắn đã thay đổi và cải thiện cách mọi người giao tiếp. Nó đóng vai trò là cầu nối giữa doanh nghiệp và

người tiêu dùng, giúp họ hoàn thành nhiệm vụ và đạt được mục tiêu của mình bất kể họ có thể ở đâu.

Chatbots, vào cuối ngày, được lập trình với các mã và lệnh mà mọi người tạo ra. Công nghệ này không hoàn hảo vì nó vẫn đang phát triển và do đó, dễ bị lỗi. Ngoài ra, việc sử dụng độc hại các chatbot trong quảng cáo và spam đã được báo cáo để lôi kéo mọi người và thu thập thông tin cá nhân. Bots và các công nghệ trí tuệ nhân tạo khác vẫn được con người theo dõi và duy trì. Khi giao dịch với bot, người tiêu dùng nên cẩn thận và bảo vệ an ninh và quyền riêng tư của họ mọi lúc.

Sự phát triển của công nghệ đã dẫn đến sự phát triển của trí tuệ nhân tạo và chatbot, mở ra cơ hội đáng kể cho các doanh nghiệp và công ty đồng thời mang lại sự tiện lợi cho người tiêu dùng. Tuy nhiên, như dự kiến, có những người cho rằng nó giới hạn các tương tác xã hội thực tế của con người.

Vâng, bất chấp sự tiện lợi mà nó mang lại, tương tác với bot và các công nghệ tương tự khác không thay thế (hoặc gây hại) cho sự tương tác của con người. Rốt cuộc, sự thành công của công nghệ phụ thuộc vào chính những người sử dụng nó và những người đứng đằng sau nó. Sử dụng các tiện ích nhắn tin chatbot có thể gây hại tới khả năng nhận thức và tương tác của con người dẫn đến kỹ năng giao tiếp không được trau dồi, con người trở nên thô lỗ và hung hăng, Mọi người đang trở nên lười biếng với thông tin và không quen kiểm tra mọi thứ hoặc không bao giờ dành thời gian suy nghĩ.

1.2 Các loại chatbox

Microsoft chatbox

Dữ liệu

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2.1 Related Work Section 1

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2.4 Conclusion

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Tiền xử lý dữ liệu

> *Innovation distinguishes between a leader and a follower.*

— **Steve Jobs**
(CEO Apple Inc.)

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3.1 System Section 1

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Fig. 3.1: Figure example: *(a)* example part one, *(c)* example part two; *(c)* example part three

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Fig. 3.2: Another Figure example: *(a)* example part one, *(c)* example part two; *(c)* example part three

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3.4 Conclusion

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Model

4.1 LSTM

Recurrent neural network

Con người không bắt đầu suy nghĩ từ đầu mỗi giây. Khi bạn đọc bài luận này, bạn hiểu từng từ dựa trên sự hiểu biết của bạn về các từ trước đó. Bạn không nên ném mọi thứ đi và bắt đầu suy nghĩ lại từ đầu. Suy nghĩ của bạn có sự lưu lại.

Mạng lưới thần kinh truyền thống có thể làm được điều này, và nó có vẻ như là một thiếu sót lớn. Ví dụ, hãy tưởng tượng bạn muốn phân loại loại sự kiện nào đang diễn ra tại mọi thời điểm trong phim. Nó không rõ làm thế nào một mạng lưới thần kinh truyền thống có thể sử dụng lý lẽ của nó về các sự kiện trước đó trong phim để thông báo cho những sự kiện sau này.

Recurrent neural network giải quyết vấn đề này. Chúng là các mạng có các vòng lặp trong đó, cho phép thông tin tồn tại.
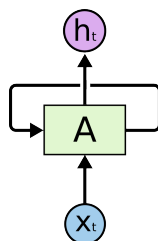

Fig. 4.1: Recurrent Neural Network có vòng lặp.

Trong sơ đồ trên, một đoạn của mạng thần kinh, A, xem xét một số xt đầu vào và xuất ra một giá trị h_t. Một vòng lặp cho phép thông tin được truyền từ một bước của mạng sang bước tiếp theo.

Những vòng lặp này làm cho Recurrent neural network có vẻ như bí ẩn. Tuy nhiên, nếu bạn suy nghĩ nhiều hơn một chút, hóa ra họ không phải là một mạng lưới thần kinh bình thường. Recurrent neural network có thể được coi là nhiều bản sao của cùng một mạng, mỗi bản tin truyền cho một người kế nhiệm. Xem xét những gì xảy ra nếu chúng ta bỏ vòng lặp:
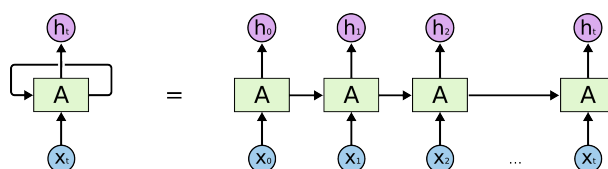
Fig. 4.2: Recurrent Neural Network đã được trải ra.

Bản chất giống như chuỗi này cho thấy các Recurrent neural network có liên quan mật thiết đến các chuỗi và danh sách. Nó sử dụng kiến trúc tự nhiên của mạng neuron để sử dụng cho dữ liệu đó.
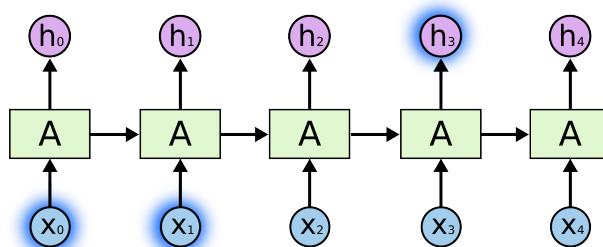
Và chúng chắc chắn được sử dụng! Trong vài năm qua, đã có những thành công đáng kinh ngạc khi áp dụng RNN cho nhiều vấn đề khác nhau: nhận dạng giọng nói, mô hình ngôn ngữ, dịch thuật, chú thích hình ảnh.

Điều cần thiết cho những thành công này là việc sử dụng "LSTMs", một loại mạng thần kinh tái phát rất đặc biệt, hoạt động, cho nhiều tác vụ, tốt hơn nhiều so với phiên bản tiêu chuẩn. Hầu như tất cả các kết quả thú vị dựa trên các mạng thần kinh tái phát đều đạt được với chúng. Nó có những LSTM mà bài tiểu luận này sẽ khám phá.

Vấn đề phụ thuộc xa

Một trong những lời kêu gọi của RNN là ý tưởng rằng họ có thể kết nối thông tin trước đó với tác vụ hiện tại, chẳng hạn như sử dụng các khung video trước đó có thể thông báo cho sự hiểu biết về khung hiện tại. Nếu RNN có thể làm điều này, thì họ cực kỳ hữu ích. Nhưng họ có thể? Không hẳn.
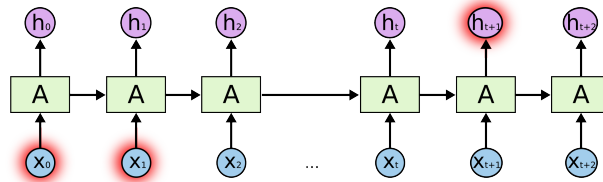
Đôi khi, chúng ta chỉ cần nhìn vào thông tin gần đây để thực hiện nhiệm vụ hiện tại. Ví dụ, hãy xem xét một mô hình ngôn ngữ đang cố gắng dự đoán từ tiếp theo dựa trên các từ trước đó. Nếu chúng ta đang cố gắng dự đoán từ cuối cùng trong "các đám mây trên *bầu trời*", thì chúng ta không cần bất kỳ bối cảnh nào nữa - đó là một điều khá rõ ràng, từ tiếp theo sẽ là *bầu trời*. Trong những trường hợp như vậy, khi khoảng cách giữa thông tin liên quan và địa điểm mà nó cần là nhỏ, RNN có thể học cách sử dụng thông tin trong quá khứ.

Nhưng cũng có những trường hợp chúng ta cần nhiều bối cảnh hơn. Cân nhắc việc cố gắng dự đoán từ cuối cùng trong văn bản. "Tôi lớn lên ở Việt Nam. Tôi nói tiếng trôi chảy tiếng *Việt*". Thông tin gần đây cho thấy từ tiếp theo có lẽ là tên của một ngôn ngữ, nhưng nếu chúng ta

muốn thu hẹp ngôn ngữ nào, chúng ta cần thu hẹp ngôn ngữ nào bối cảnh của Việt Nam, từ phía trước. Nó hoàn toàn có thể cho khoảng cách giữa thông tin liên quan và điểm cần thiết để trở nên rất lớn.

Thật không may, khi khoảng cách đó tăng lên, các RNN trở nên không thể học cách kết nối thông tin.

Về lý thuyết, các RNN hoàn toàn có khả năng xử lý các phụ thuộc dài hạn như vậy. Một người có thể cẩn thận chọn các tham số cho họ để giải quyết các vấn đề về đồ chơi theo hình thức này. Đáng buồn thay, trong thực tế, RNNs don lồng dường như có thể học chúng. Vấn đề đã được khám phá sâu bởi Hochreiter (1991) [German] và Bengio, et al. (1994), người đã tìm thấy một số lý do khá cơ bản tại sao nó có thể khó khăn.

Rất may, LSTMs không có vấn đề này!

4.2 Seq2seq

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

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Kết quả đạt được 5

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5.1 System Section 1

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5.3 Future Work

This is the second paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

And after the second paragraph follows the third paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this

text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

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List of Figures

List of Tables

Colophon

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Declaration

You can put your declaration here, to declare that you have completed your work solely and only with the help of the references you mentioned.

, 13/06/2019

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