

Appendix

Anonymous submission

This appendix accompanies “Navigating the Noisy Crowd: Finding Key Information for Claim Verification.” Appendix A contains the complete prompts for EACon along with in-context examples. Appendix B contains the prompts for the baseline models used in our study. Appendix C illustrates both effective and ineffective cases of our model.

A Prompts for EACon

All the in-context examples used in EACon are derived from the in-context examples used in ProgramFC. Based on the differences in the functional modules of EACon, we selected and utilized some of these examples and provided manual demonstrations of their output formats and content, as shown below.

A.1 Prompt for Keyword Extraction

Task Description: Extract key components such as important verbs, nouns, and phrases from the provided sentence. Focus on identifying and highlighting the most relevant elements.

Instructions: Carefully read the input sentence. Identify and list the significant verbs, nouns, and pertinent phrases. Ensure the output succinctly encapsulates the essence of the input by focusing on these key components.

Examples:

Input: Howard University Hospital and Providence Hospital are both located in Washington, D.C.

Output: Howard University Hospital, Providence Hospital, located, Washington, D.C.

Input: WWE Super Tuesday took place at an arena that currently goes by the name TD Garden.

Output: WWE Super Tuesday, took place, name, TD Garden.

Input: Talking Heads, an American rock band that was “one of the most critically acclaimed bands of the 80’s,” is featured in KSPN’s AAA format.

Output: Talking Heads, bands of the 80’s, KSPN’s AAA format.

Input: Don Ashley Turlington graduated from Saint Joseph’s College, a private Catholic liberal arts college in Standish.

Output: Don Ashley Turlington, graduate, Saint Joseph’s College, private Catholic liberal arts college, Standish.

Input: Gael and Fitness are not published in the same country. Output: Gael, Fitness, publish, country.

Input: Blackstar is the name of the album released by David Bowie that was recorded in secret.

Output: Blackstar, album, David Bowie, secret.

Input: In the 2004 Hockey film produced by a former major league baseball pitcher, Kurt Russell played the USA coach. Output: 2004 Hockey film, former major league baseball pitcher, Kurt Russell, USA coach.

Input: Along with the New York Islanders and the New York Rangers, the New Jersey Devils NFL franchise is popular in the New York metropolitan area.

Output: New York Islanders, New York Rangers, New Jersey Devils NFL franchise, popular, New York metropolitan area.

Input: Jack McFarland is the best known role of the host of the 64th Annual Tony Awards.

Output: Jack McFarland, host, 64th Annual Tony Awards.

Input: The song recorded by Fergie that was produced by Polow da Don and was followed by Life Goes On was M.I.L.F. \$.

Output: song, produced, Fergie, Polow da Don, followed, Life Goes On, M.I.L.F. \$.

Input: Gregg Rolie and Rob Tyner, are not a keyboardist. Output: Gregg Rolie, Rob Tyner, keyboardist.

Input: Maria Esther Andion Bueno, not Jimmy Connors, is the player that is from Brazil.

Output: Maria Esther Andion Bueno, player, Brazil, Jimmy Connors.

Input: Vladimir Igorevich Arnold died after Georg Cantor.

Output: Vladimir Igorevich Arnold, died, Georg Cantor.

Input: Barton Mine was halted by a natural disaster, not Camlaren Mine.

Output: Barton Mine, halted, natural disaster, Camlaren Mine.

Input: John O'Hara and Rabindranath Tagore are not the same nationality.

Output: John O'Hara, Rabindranath Tagore, nationality.

Input: Thomas Loren Friedman has won more Pulitzer Prizes than Colson Whitehead.

Output: Thomas Loren Friedman, won, Pulitzer Prizes, Colson Whitehead.

Input: The model of car Trevor Bayne drives was introduced for model year 2006. The Rookie of The Year in the 1997 CART season drives it in the NASCAR Sprint Cup.

Output: The model of car, Trevor Bayne, drives, introduced, model year 2006, NASCAR Sprint Cup, Rookie of The Year, 1997 CART season.

Based on the following input, identify and list the key components as demonstrated in the examples.

Input: [Claim] (c)

Output:

A.2 Prompt for Evidence Summarization

Task Description: Extract and summarize key information from sentences based on specified keywords. The output should be concise, directly related to the keywords, and devoid of extraneous details.

Instructions: Carefully read the provided input sentence. Use the specified keywords to guide your extraction of information. Generate a summary that includes only the facts directly associated with the keywords.

Examples:

Input: Providence Hospital is a 408 bed hospital located in the District of Columbia. Founded in 1861, it is the longest continuously operating hospital in the District. Providence Hospital is a member of Ascension Health, the largest non-profit health care organization in the United States.

Keywords: Providence Hospital, located, Washington, D.C.

Output: Providence Hospital is located in Washington, D.C.

Input: TD Garden, often called Boston Garden and "The Garden", is a multi-purpose arena in Boston, Massachusetts. It is named after its sponsor, TD Bank,

a subsidiary of Canada's Toronto-Dominion Bank. It opened in 1995 as a replacement for the original Boston Garden and has been known as Shawmut Center, FleetCenter, and TD Banknorth Garden. The arena is located directly above the MBTA's North Station.

Keywords: name, TD Garden.

Output: TD Garden, also known as Boston Garden, is named after TD Bank.

Input: "Life Goes On" is a song recorded by American singer Fergie for her second studio album, "Double Dutchess" (2017). It was released as a single on November 11, 2016, by Interscope and will.i.am Music Group. The song serves as the third single from Fergie's second studio album, following "M.I.L.F. \$". "Life Goes On" was written by Fergie, Tristan Prettyman, Keith Harris and Toby Gad.

Keywords: song, Fergie, followed, Life Goes on, M.I.L.F. \$.

Output: "Life Goes On" is a song by Fergie following "M.I.L.F. \$".

Input: KSPN-FM is an adult album alternative radio station owned by Patricia MacDonald Garber and Peter Benedetti, through licensee AlwaysMountainTime, LLC, and broadcasts at 103.1 MHz FM in the Aspen, Colorado area. The station airs an adult album alternative format and uses the slogan "The Valley's Quality Rock". With over 30 years of Quality Rock experience, this heritage station is the Roaring Fork Valley's favorite among both locals and tourists. KSPN covers all community and national events in the area: World Cup Championships, the 24 Hours of Aspen, Winterskol and Blitzenbanger. KSPN features the AAA format, which combines the classic rock hits from Tom Petty, Van Morrison and Talking Heads with today's newer musicians like Ben Harper, Blues Traveler, Sonia Dada and Widespread Panic.

Keywords: Talking Heads, KSPN's AAA format.

Output: KSPN features Talking Heads in its AAA format.

Input: Gina Bramhill was born in Eastoft, where she grew up on a farm. As a child, she appeared in several school plays. She was trained at the Royal Academy of Dramatic Art. Shortly after graduating she appeared as Bella in the movie Lotus Eaters. 2012 she got a role as the recurring character Eve Sands in the TV series Being Human. In the same year Bramhill played one of the main roles in the drama pilot The Frontier. In Coronation Street she portrayed the character Jodie Woodward. She got a main role in the movie Pleasure Island, which was shown at the Cannes Film Festival in 2014.

Keywords: Gina Bramhill, born.

Output: Gina Bramhill was born in Eastoft.

Given the following input and keywords, provide a concise and factual summary based on the examples above.

Exclude any information not directly related to the key-words.

Input: [Raw Evidence] (e_i)

Keywords: [Selected Keywords] (S_i)

Output:

A.3 Prompt for Claim Deconstruction

Task Description: Dissect a given claim into multiple atomic statements. These statements should be complete in meaning, devoid of uncertain pronouns, and retain all original details. Each atomic statement should stand alone and be independently verifiable.

Examples:

Claim: Howard University Hospital and Providence Hospital are both located in Washington, D.C.

Output: \n #1 Howard University Hospital is located in Washington, D.C. \n #2 Providence Hospital is located in Washington, D.C.

Claim: WWE Super Tuesday took place at Fleet Center. Fleet Center currently goes by the name TD Garden.

Output: \n #1 WWE Super Tuesday took place at Fleet Center. \n #2 Fleet Center currently goes by the name TD Garden.

Claim: An IndyCar race driver drove the Super Aguri F1 SA07 during the 2007 Formula One season. The Super Aguri F1 SA07 was designed by Peter McCool.

Output: \n #1 An IndyCar race driver drove the Super Aguri F1 SA07 during the 2007 Formula One season. \n #2 The Super Aguri F1 SA07 was designed by Peter McCool.

Claim: Gina Bramhill was born in Eastoft. The 2011 population of the area that includes Eastoft was 167,446.

Output: \n #1 Gina Bramhill was born in Eastoft. \n #2 The 2011 population of the area that includes Eastoft was 167,446.

Claim: Colson Whitehead has won less than three Pulitzer Prizes.

Output: \n #1 Colson Whitehead has won less than three Pulitzer Prizes.

Claim: Don Ashley Turlington graduated from Saint Joseph's College, a private Catholic liberal arts college in Standish.

Output: \n #1 Saint Joseph's College is a private Catholic liberal arts college located in Standish. \n #2 Don Ashley Turlington graduated from Saint Joseph's College.

Claim: Fitness is not published in Belgium.

Output: \n #1 Fitness is not published in Belgium.

Claim: Blackstar is the name of the album released by David Bowie that was recorded in secret.

Output: \n #1 David Bowie released an album called Blackstar. \n #2 David Bowie released an album called Blackstar.

Claim: In the 2004 Hockey film named Miracle produced by a former major league baseball pitcher Kurt Russell played the USA coach.

Output: \n #1 Miracle is a 2004 Hockey film produced by a former major league baseball pitcher. \n #2 Kurt Russell played the USA coach in the film Miracle.

Claim: Along with the New York Islanders and the New York Rangers, the New Jersey Devils NFL franchise is popular in the New York metropolitan area.

Output: \n #1 The New York Islanders and the New York Rangers are popular in the New York metropolitan area. \n #2 The New Jersey Devils NFL franchise is popular in the New York metropolitan area.

Claim: The song recorded by Fergie that was produced by Polow da Don and was followed by Life Goes On was M.I.L.F.\$.

Output: \n #1 M.I.L.F.\$ was recorded by Fergie that was produced by Polow da Don. \n #2 M.I.L.F.\$ was followed by Life Goes On.

Claim: Jack McFarland is the best known role of Sean Patrick Hayes.

Output: \n #1 Jack McFarland is the best known role of Sean Patrick Hayes.

Claim: Gregg Rolie and Rob Tyner, are not a keyboardist.

Output: \n #1 Gregg Rolie is not a keyboardist. \n #2 Gregg Rolie is not a keyboardist.

Claim: Maria Esther Andion Bueno, not Jimmy Connors, is the player that is from Brazil.

Output: \n #1 Maria Esther Andion Bueno is from Brazil. \n #2 Maria Esther Andion Bueno is from Brazil.

Claim: Georg Cantor died before 3 June 2010.

Output: \n #1 Georg Cantor died before 3 June 2010.

Claim: Ford Fusion was introduced for model year 2006. Patrick Carpentier drives Ford Fusion in the NASCAR Sprint Cup.

Output: \n #1 Ford Fusion was introduced for model year 2006. \n #2 Patrick Carpentier drives Ford Fusion in the NASCAR Sprint Cup.

Claim: Barton Mine was halted by a natural disaster not Camlaren Mine.

Output: \n #1 Barton Mine was halted by a natural disaster. \n #2 Camlaren Mine was not halted by a natural disaster.

Here is the claim given to you. Your answer should follow the format of above demonstrations. Each atomic

statement should stand alone and be independently verifiable with as least pronouns as possible. Give your answer only, no explanation.

Claim: [Claim] (*c*)

Output:

A.4 Prompt for Subclaim Verification

Given golden evidence:

[Abstracted Evidence & Raw Evidence] ($\mathcal{A} \cup \mathcal{E}$)

In the saying of [Claim] (*c*). Based on the golden evidence, is it true that [Subclaim] (*u_i*)? (Yes or No)

The segment of the prompt highlighted in **dark color** is optional, as explained in the main paper. The underlined part in parentheses should be replaced with *Answer in one word, you should be strict, if the saying is not matching golden evidence in any detail, you should deny it by saying no* when using the Vicuna model, as it has a strong bias toward answering “yes.”

B Prompts for baseline models

B.1 Prompt for ProgramFC

ProgramFC consists of two modules: program generation and code execution. The original authors implemented ProgramFC using the FlanT5 model for code execution. In our paper, to maintain the same experimental conditions, we used two chat language models, Mixtral and Vicuna, for the implementation. Since FlanT5 is not a chat model, we made slight modifications to the original prompt for question answering to adapt it for the chat language models.

Modified prompt for question answering in ProgramFC:

[Raw Evidence] (\mathcal{E})

Question: [Question]

The answer is: (*Answer it directly, no explanation*)

The *italicized* part is the modification we added to the original prompt. All other prompts remain consistent with the original.

B.2 Prompt for Zero-Shot

Given golden evidence:[Raw Evidence] (\mathcal{E})

Based on the golden evidence, is it true that [Claim] (*c*)? (Yes or No)

B.3 Prompt for Few-Shot

We omitted more in-context examples used because we are using the same samples as ProgramFC.

Decide a claim’s truthfulness based on the golden evidence provided. Following are some examples.

Given golden evidence: Eastoft is a village and civil parish in North Lincolnshire, England. It is situated within the Isle of Axholme, 3 mi north-east from Crowle,

and on the A161 road. Gina Bramhill was born in Eastoft, where she grew up on a farm. North Lincolnshire is a unitary authority area in the region of Yorkshire and the Humber in England. The population of the Unitary Authority at the 2011 census was 167,446.

Based on the golden evidence, is it true that Gina Bramhill was born in a village. The 2011 population of the area that includes this village was 167,446.

Answer: Yes

Given golden evidence: The New York Islanders season was the third season for the franchise in the National Hockey League. During the regular season, the Islanders finished in third place in the Patrick Division with a 33-2522 record and qualified for the Stanley Cup playoffs for the first time in the franchise’s history. The New York Rangers are a professional ice hockey team based in New York City. The Rangers are one of three NHL franchises in the New York metropolitan area, along with the New Jersey Devils and New York Islanders. The Rangers were the first NHL franchise in the United States to win the Stanley Cup, which they have done four times.

Based on the golden evidence, is it true that Along with the New York Islanders and the New York Rangers, the New Jersey Devils NFL franchise is popular in the New York metropolitan area?

Answer: No

...[More Examples]...

Given golden evidence:[Raw Evidence] (\mathcal{E})

Based on the golden evidence, is it true that [Claim] (*c*)? (Yes or No)

Answer:

C Cases

Examples of the model are on the next pages (one demonstrating a correct prediction and two illustrating incorrect predictions).

Claim: John Hume, the singer of What Did I Do?, made the New Zealand band Evermore.	
Keywords: John Hume, singer, What Did I Do?, made, Evermore	
Evidence 1: Kelechukwu 'Kele' Okereke (born 13 October 1981), also known by the mononym Kele, is a British musician, best known as the lead singer and rhythm guitarist of the indie rock band Bloc Party.	
Selected Keywords: NONE	
Abstracted Evidence: NONE	
Evidence 2: Jon Hume (born 6 November 1983) is the lead singer of Evermore. He is a singer-songwriter, multi-instrumentalist, Record Producer and Studio owner. Jon is the eldest of the three brothers who make up the New Zealand band Evermore.	
Selected Keywords: John Hume, singer, made, Evermore	
Abstracted Evidence: Jon Hume is a singer and singer-songwriter who is the lead singer of the band Evermore, which is made up of him and his two brothers.	
Evidence 3: 'What Did I Do?' is a song by Kele Okereke, released as the first single from his EP 'The Hunter'. The song's music video was released on 13 September 2011, with the song being released as a digital single in Japan 10 days later. The song features vocals from singer Lucy Taylor. The single was produced by constant collaborator XXXChange and mixed by Sub Focus.	
Selected Keywords: singer, What Did I Do?	
Abstracted Evidence: The singer of "What Did I Do?" is Kele Okereke. The song features vocals from Lucy Taylor.	
Subclaim 1: John Hume is a singer.	Subpredict: True
Subclaim 2: John Hume sang the song What Did I Do?.	Subpredict: False
Subclaim 3: Evermore is a band from New Zealand.	Subpredict: True
Subclaim 4: John Hume made the band Evermore.	Subpredict: True
Label: False	Final Prediction: False

Figure 1: An example of EACon making a correct prediction.

Claim: Viacom subsidiary, the company that produced the movie I Loved a Soldier, made the silent film Through the Glass Window in 1922.	
Keywords: Viacom subsidiary, produced, movie I Loved a Soldier, silent film, Through the Glass Window, 1922	
Evidence 1: Paramount Pictures Corporation (also known simply as Paramount) is an American film studio based in Hollywood, California, that has been a subsidiary of the American media conglomerate Viacom since 1994. Paramount is the fifth oldest surviving film studio in the world, the second oldest in the United States, and the sole member of the 'Big Six' film studios still located in the Los Angeles neighborhood of Hollywood. In 1916, film producer Adolph Zukor contracted 22 actors and actresses and honored each with a star on the logo. These fortunate few would become the first 'movie stars.' In 2014, Paramount Pictures became the first major Hollywood studio to distribute all of its films in digital form only.	
Selected Keywords: Viacom subsidiary, produced, silent film	
Abstracted Evidence: Paramount Pictures, a subsidiary of Viacom, produced silent films and was the first studio to honor its actors with a star on the logo.	
Evidence 2: Through a Glass Window is a 1922 American drama silent film directed by Maurice Campbell and written by Olga Printzlau. The film stars May McAvoy, Fanny Midgley, Burwell Hamrick, Raymond McKee, F. A. Turner and Carrie Clark Ward. The film was released on April 2, 1922, by Paramount Pictures.	
Selected Keywords: silent film, Through the Glass Window, 1922	
Abstracted Evidence: Through a Glass Window is a 1922 silent film directed by Maurice Campbell and written by Olga Printzlau. It was released by Paramount Pictures.	
Evidence 3: I Loved a Soldier (also known as Invitation to Happiness) is an unfinished 1936 American romantic-comedy-drama film directed by Henry Hathaway and produced by Paramount Pictures. It stars Marlene Dietrich, Charles Boyer, Walter Catlett, Lionel Stander, and Margaret Sullivan.	
Selected Keywords: produced, movie I Loved a Soldier	
Abstracted Evidence: Movie "I Loved a Soldier" was produced by Paramount Pictures.	
Subclaim 1: Viacom is a subsidiary company.	Subpredict: True
Subclaim 2: Viacom produced the movie I Loved a Soldier.	Subpredict: False
Subclaim 3: A silent film named Through the Glass Window was made in 1922.	Subpredict: True
Subclaim 4: Viacom made the silent film Through the Glass Window in 1922.	Subpredict: True
Label: True	Final Prediction: False

Figure 2: An example of EACon making an incorrect prediction due to a wrong assessment of subclaim 2.

Claim: Scott Michael Smith worked on the streaming service HULU series that Reed Morano directed the first three episodes of that was based on the novel The Handmaid's Tale by Margaret Atwood.	
Keywords: Scott Michael Smith, worked, HULU series, Reed Morano, directed, The Handmaid's Tale, Margaret Atwood's novel	
Evidence 1: The Handmaid's Tale is a 1985 dystopian novel by Canadian author Margaret Atwood. Set in a near-future New England, in a totalitarian, Christian theonomy that has overthrown the United States government, the novel explores themes of women in subjugation and the various means by which they gain individualism and independence. The novel's title echoes the component parts of Geoffrey Chaucer's 'The Canterbury Tales', which is a series of connected stories ('The Merchant's Tale', 'The Parson's Tale', etc.).	
Selected Keywords: HULU series, directed, The Handmaid's Tale, Margaret Atwood's novel	
Abstracted Evidence: The Handmaid's Tale is a novel written by Margaret Atwood, which has been adapted into a HULU series.	
Evidence 2: Scott Michael Smith (born June 28, 1984) is an American audio engineer, record producer, and multi-instrumentalist based in Los Angeles, California. Smith has worked with John Mayer, Fink, Colbie Caillat, Katy Perry, Carole King, and Weezer amongst many others. Smith has worked extensively in film and television music as well. Some of Smith's work includes World War Z, , and the academy award winning film The Revenant. Smith mixes the music for the Emmy award winning series The Handmaid's Tale.	
Selected Keywords: Scott Michael Smith, worked, HULU series, The Handmaid's Tale	
Abstracted Evidence: Scott Michael Smith has worked as an audio engineer, record producer, and multi-instrumentalist, and he mixed the music for the Emmy award-winning HULU series The Handmaid's Tale.	
Evidence 3: Reed Morano (born April 15, 1977) is an American cinematographer and director. Reed is known for her cinematography on feature films such as 'Kill Your Darlings', 'The Skeleton Twins' and 'Frozen River', all of which premiered at the Sundance Film Festival. In 2015, Morano made her directorial debut with her feature film 'Meadowland'. She also directed the first three episodes of Hulu's 2017 television adaptation of Margaret Atwood's 'The Handmaid's Tale'. In 2013, Morano became the youngest member of the American Society of Cinematographers, and one of 14 women in an organization of approximately 345 active members.	
Selected Keywords: Reed Morano, directed, The Handmaid's Tale, Margaret Atwood's novel	
Abstracted Evidence: Reed Morano, director, directed Hulu's 2017 television adaptation of Margaret Atwood's 'The Handmaid's Tale'.	
Subclaim 1: Scott Michael Smith worked on the HULU series The Handmaid's Tale.	Subpredict: True
Subclaim 2: Reed Morano directed the first three episodes of The Handmaid's Tale.	Subpredict: True
Subclaim 3: The Handmaid's Tale is a novel by Margaret Atwood.	Subpredict: True
Subclaim 4: The Handmaid's Tale streaming service is HULU.	Subpredict: True
Label: False	Final Prediction: True

Figure 3: An example of EACon making an incorrect prediction due to incorrectly abstracting evidence 2, summarizing The Handmaid's Tale as a HULU series, which leads to the wrong prediction of subclaim 1.