

Multi Document Summarization Experiment

1 introduction

We compared multi document summarization models fine-tuned on multi-news datasets for text summarization task available on Hugging-Face for PRIMERA, and CENTRUM with maximum input length of 4096 for a multi document (length of individual document = $\frac{4096}{\text{Number of documents}}$). We use implementation of fine-tuned model available on github for REFLECT with maximum input length of 6144 for a multi document. We denoted each fine-tuned model with Mm_x . Automatic evaluations using ROUGE-1, ROUGE-2, ROUGE-3, ROUGE-L, CHRF-1, Meteor, and BertScore was carried out on each Mm_x generated summary with respect to the reference summary. And executed factual consistency check with the source document as evidence for Example-multi-document 1, and the reference as evidence for Example-multi-document 2, and the generated summary as claim.

The following are brief description of the fine-tuned models. The parameters of each fine-tuned model can be found in the dedicated github repository (Training-Parameters).

- Mm_1 - **PRIMERA**: allenai/PRIMERA-multinews, PRIMERA large fine-tuned on the multi-news dataset.
- Mm_2 - **CENTRUM**: ratishsp/Centrum-multinews, CENTRUM fine-tuned on the multi-news dataset.
- Mm_3 - **REFLECT**: yunzhusong/NAACL2022-REFLECT, REFLECT fine-tuned on the multi-news dataset.

2 Sampled document

Example-multi-document 1 Table 1 Evaluation of Example-multi-document 1 on ROUGE-1, ROUGE-2, ROUGE-3, ROUGE-L, CHRF-1, Meteor, BertScore metrics, and Factual consistency ('Y'). In bold is the top 2 score for each metric and the minimum factual consistent fine-tuned model.

Given the following source document and reference from the multi-news dataset:

- **MULTI DOCUMENT TO SUMMARIZE** -
BALTIMORE (AP) — The U.S. Coast Guard says it’s looking for a man who has cost the service about \$500,000 after responding to nearly 30 of his fake distress calls. In a press release published Friday, the Coast Guard says the 28 calls have originated from around the area of Annapolis, Maryland. Each call involved the same male voice and used an emergency radio channel. He’s been making the calls since July 2014. The two most recent calls were made on the night of July 21 and the early morning of July 22. The Coast Guard also says hoax calls distract rescuers from real emergencies, putting both the public and the responding crews at risk. ||||| A hoax caller in Maryland cost the Coast Guard about \$500,000 in the past two years by making false distress alerts. The caller made 28 false distress alerts from Annapolis, Maryland, beginning in July 2014, according to the Coast Guard. The two most recent calls were received Thursday and Friday, the Coast Guard reported. They also said they determined the calls to have originated from Annapolis, between Loretta Heights and Admiral Drive. The estimated cost of the responses to these false alarms is \$500,000. The Coast Guard provided an

audio file of the caller, in which the caller repeats “mayday” – a word used to indicate distress at sea. Making false distress calls is a felony, punishable by a maximum of six years in prison, a \$10,000 civil fine, \$250,000 criminal fine and a reimbursement to the Coast Guard for their efforts, the Coast Guard said. The Coast Guard also said such false distress alerts detract from their ability to respond to actual alerts. “A hoax call is a deadly and serious offense,” said Lt. Cmdr. Sara Wallace, who heads the response sector in Maryland. “Calls like these not only put our crews at risk, but they put the lives of the public at risk.” Anyone with information about the caller is asked to contact the Coast Guard’s regional command center at 410-576-2525 or email investigators at CGIS-Baltimore@uscg.mil.

- **Reference** - The US Coast Guard says it’s looking for a man who has cost the service about \$500,000 after responding to nearly 30 of his fake distress calls, reports the AP. In a press release published Friday, the Coast Guard says the 28 calls have originated from around the area of Annapolis, Maryland. Each call involved the same male voice and used an emergency radio channel. He’s been making the calls since July 2014. The two most recent calls were made on the night of July 21 and the early morning of July 22. “A hoax call is a deadly and serious offense,” a Coast Guard rep tells NBC4, which notes that such calls are a felony that carry six years in prison, \$10,000 civil fine, \$250,000 criminal fine, and reimbursement to the Coast Guard. “Calls like these not only put our crews at risk, but they put the lives of the public at risk.
- **Generated summary:** The generated summary for each pre-trained model:

Mm₁ - BALTIMORE (AP) — The U.S. Coast Guard says it’s looking for a man who has cost the service about \$500,000 after responding to nearly 30 of his fake distress calls. In a press release published Friday, the Coast Guard says the 28 calls have originated from around the area of Annapolis, Maryland. Each call involved the same male voice and used an emergency radio channel..

Mm₂ - The US Coast Guard says it’s looking for a man who has cost the service about \$500,000 after responding to nearly 30 of his fake distress calls, the AP reports. In a press release published Friday, the Coast Guard says the 28 calls have originated from around the area of Annapolis, Maryland. Each call involved the same male voice and used an emergency radio channel. He’s been making the calls since July 2014. The two most recent calls were made on the night of July 21 and the early morning of July 22. The Coast Guard also says hoax calls distract rescuers from real emergencies, putting both the public and the responding crews at risk.

Mm₃ - BALTIMORE (AP) — The U.S. Coast Guard says it’s looking for a man who has cost the service about \$500,000 after responding to nearly 30 of his fake distress calls. The caller made 28 false distress alerts from Annapolis, Maryland, beginning in July 2014, according to the Coast Guard. The two most recent calls were made on the night of July 21 and the early morning of July 22. The Coast Guard said in a press release Friday that the caller has been identified as a man in his 30s. He’s been making the calls since July 2014. The caller is believed to be in his mid-30s and has lived in the area of Loretta Heights and Admiral Drive in Annapolis for the past two years. The caller’s identity has not been released. The caller has not yet been arrested. The estimated cost of the responses to these false alarms is \$ 500,000. SourceFile Each call involved the same male voice and used an emergency radio channel. “A hoax call is a deadly and serious offense,” said Lt. Cmdr. Sara Wallace, who heads the response sector in Maryland. “Calls like these not only put our crews at risk, but they put the lives of the public at risk.” Anyone with information about the caller is asked to contact the Coast Coast Guard’s regional command center at 410-576-2525 or email investigators at CGIS-Baltimore@uscg.mil. ||||| A hoax caller

| Model | ROUGE-1 | ROUGE-2 | ROUGE-3 | ROUGE-L | CHRF-1 | Meteor | BertScore | FactCheck |
|--------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|
| Mm_1 | 0.5752 | 0.5357 | 0.5225 | 0.5575 | 0.5788 | 0.3563 | 0.9233 | 1.0 |
| Mm_2 | 0.787 | 0.7127 | 0.6667 | 0.7509 | 0.7566 | 0.6366 | 0.9541 | 0.95 |
| Mm_3 | 0.642 | 0.5211 | 0.4638 | 0.4198 | 0.5885 | 0.5995 | 0.9014 | 0.85 |

Table 1: Evaluation of Example-multi-document 1.

Example-multi-document 2 Given the following source document and reference from the Multi-news dataset, Table 2 show result of Evaluation of Example-long-document 2. In bold is the top 2 score for each metric, and the minimum factual consistent fine-tuned model:

• **MULTI DOCUMENT TO SUMMARIZE -**

The seed for this crawl was a list of every host in the Wayback Machine This crawl was run at a level 1 (URLs including their embeds, plus the URLs of all outbound links including their embeds) The WARC files associated with this crawl are not currently available to the general public. ||||| Summary: Microsoft’s acquisition of Nokia is aimed at building a devices and services strategy, but the joint company won’t take the same form as Apple. Microsoft has been working on its evolution into a devices and services company, away from the services business it has traditionally been, for several years now with limited success. Its acquisition of most of Nokia is the latest acceleration of that strategy — to move further away from the moribund world of the beige desktop and towards the sunlit world of smartphones and tablets. Owning the desktop (via Windows) and building additional services on top, like Office or search, has been vital for Microsoft’s strategy until now, so as our interest shifts from the desktop to the tablet or smartphone it’s essential to Microsoft’s broader business (even Azure) that it can retain that connection in some form. To be a winner in the business market it also has to be a winner in the consumer market, something that wasn’t the case a decade ago. As Microsoft’s own presentation about the deal, announced on Monday, notes: ”With the consumerisation of IT user matter at both home and work... We cannot risk having Apple or Google foreclose app innovation, integration, distribution or economics.” Nokia lashed itself to Microsoft’s mast after losing out to iOS and Android in the smartphone market share stakes and with the limited success of the Lumia range so far enough to keep interest in Windows Phone alive, most analysts are seeing a certain amount of inevitability to the acquisition, even if they are split on what its biggest implications are. Forrester mobile analyst Charles Golvin said the steadily diminishing investments by other Windows Phone licensees has left Microsoft with just Nokia as its standard bearer and added Microsoft now appears ”poised to adopt a vertically integrated strategy more akin to Apple’s”. But he said Microsoft’s challenge remains how to unite the myriad services and brands — Windows, Nokia, Live, Surface, Xbox, Bing and more — into a cohesive experience that will command and cement customer loyalty. ”That’s a tall order and one that should weigh strongly on the board’s choice of a new CEO,” he said. Richard Holway, chairman of analyst TechMarketView, said given that Microsoft paid \$8.5bn for Skype in 2011, the price it is paying for Nokia ”seems extremely reasonable”. However, he added: ”Our only ’surprise’ now is the timing of the announcement. For such a big deal to come just days after Ballmer stood down seems mighty strange.” For Holway, there is also an opportunity for the enlarged Microsoft to step up its business mobility efforts: ”There is undoubtedly a market opportunity for the creation of a provider of mobile solutions for the enterprise. Taking Office onto various mobile platforms. Providing secure emailing in a sector once occupied by BlackBerry.” But such a move carries its own risks — Microsoft’s success has been build on being hardware agnostic and persuading device manufacturers to support it. Already its move into the tablet market with Surface will have unsettled its manufacturers which have struggled to come up with convincing form factors to tackle the decline of the PC. If Nokia’s rumoured tablet appears too, this will further complicate Microsoft’s relations with these partners who are essential for the success of Windows 8 (as well as Office and other products). But, as Holway points out, ”on balance, Microsoft needed to

make a bold move into mobile. Not doing so would mean certain terminal decline. This way at least holds out some chance of survival.” Carolina Milanesi, research vice president at analyst Gartner, said by buying rather than just partnering with Nokia, Microsoft gets deeper integration, the benefit of its patents and removes any risk of Nokia either going Android or being acquired by someone else. But success against iOS and Android will depend on how the companies integrate. “Nokia benefits from higher RD spend as well as more marketing budget. Microsoft benefits from a good relationship with carriers, good direct channel presence in emerging markets, the potential of going after more aggressively to the business market,” she told ZDNet. But for Milanesi, business is a secondary concern, even if it is an attractive target where Microsoft, and to a less extent Nokia, have experience: “First and foremost it needs to be about consumers. Enterprise are certainly a target especially considering the state BlackBerry is in but consumers make or break a phone vendor today.” From Milanesi’s point of view, emerging markets need to be a longer term target for Microsoft — but the battle needs to be won in the mature markets first. For Forrester principal analyst Thomas Husson, Nokia adds to Microsoft’s developing market strategy. It’s looking increasingly likely that the US and western European smartphone market is reaching saturation, so that most growth will come from emerging markets. Here Nokia’s Asha devices could play a neat role as an ‘on-ramp’ for consumers buying their first smartphone. Tied in with a revamped tablet strategy this could open up a new front against Android in particular. But Husson cautioned: “This is going to be a long journey. In some countries, Windows Phone 8 market share is now above five percent and close to 10 percent. It thus still offers a limited reach for developers and marketers. ”Nokia is indeed still massively popular in some emerging countries but competition is very high with Far East manufacturers and low-cost Android devices. I think it will depend on Microsoft’s new strategy for emerging markets beyond just mobile phones.” All of this shows the number of competing — and occasionally contradictory — demands upon Microsoft’s management. As the incumbent player in a fading market, Microsoft has a take into account those differing requirements as it tries to build for the future. For example, balancing Microsoft’s business customers against the need to get into consumer tech, the need to build its own hardware business against the need to keep manufacturers onside, and building up a mobile business while protecting its PC heritage. It’s easy to look at Apple’s integrated hardware and software model and the rich ecosystem that sits around it, but it’s much harder to emulate. Global coverage: Nokia Interim CEO: Microsoft deal makes us stronger — Even with Nokia devices, Microsoft wants to license Windows Phone to other makers — Does its Nokia buy thwart or fuel a possible Microsoft break-up? — Microsoft shows how to flush decades of Nokia goodwill away — Microsoft gets less than \$10 per Windows Phone unit — Microsoft-Nokia deal: Reaction from the Twitter trenches — Elop drops Nokia CEO role to lead devices team under Microsoft deal Further reading ||||| Microsoft is buying Nokia’s cell phone business and licensing its patent portfolio, according to both companies. In 2003, Nokia’s cell phone market share exceeded 35%. That same year, its phone business alone posted an operating profit of 5.48 billion euros. Today’s sale price, which includes 1.65 billion euros in patents, is just below 5.44 billion euros. It’s been a rough decade. Nokia’s cell phone collapse has been a spectacular one. The Finnish giant dominated the dumbphone era after Motorola, another faded star that recently fell into the hands of a comparative upstart. But it was blindsided by Apple, then deprived of a chance to regain its footing by an even more aggressive Google, which followed close behind. The story, in hindsight, is simple: Nokia did not have a truly compelling smartphone ready when a large segment of the developed world was first compelled by smartphones. Whether this was the result of complacency — Nokia was, in the mid-2000s, the leader of the niche smartphone category — doesn’t matter now. Nokia’s miscalculations became impossible to ignore in 2008, the same year Microsoft decided, internally at least, to scrap its ancient and inadequate Windows Mobile platform in favor of something entirely new. Under these circumstances, it’s easy to imagine how a sort of camaraderie might have emerged at the time, or at least a mutual sympathy. Certainly a shared interest: to break back into the market from which

they had been unceremoniously expelled. During the next two years, while Microsoft readied Windows Phone 7 and Nokia floundered on, the seeds of Sunday's deal were sewn. A chastened Nokia was a natural partner for the tardy but determined Microsoft; it needed a software solution and Microsoft needed help with hardware. The 2009 vision of 2013 renders clearly: Two giants, united after some missteps, regain their rightful place. By 2010, when the head of Microsoft's Business division left to take the helm at Nokia, the gears were moving. Many at the time wondered if Stephen Elop's time at Nokia would be spent grooming the company for purchase — a foreigner in all possible ways, he began his time at the company with a memo rightly but offensively declaring Nokia's proud platform a failure, and quickly pledged the company's commitment to the still-tiny Windows Phone. It felt like a radical about-face, but no matter: Nokia and Microsoft were going to save each other. Now, with Elop returning to Microsoft after a job well done — well, a job, done — that plan has come to fruition. The only problem is that there's little left to save. Windows Phone has barely dented the now much larger smartphone market. Nokia hasn't had a Windows Phone hit. This incongruity — between a successfully executed, slyly strategic long-term merger plan and a much grander, more general sense of failure — might explain Microsoft's deeply strange and somewhat sad stated goals for its Nokia acquisition. Microsoft's "Strategic Rationale," titled "Accelerating Growth," is a disjointed and bizarre document. It manages to sound both insane and uninspiring, outlining modest goals that still sound unrealistic. For example, it lays out a plan to pull in over \$45 billion dollars in smartphone revenue by 2018. But it plans on doing this by securing just 15% of the projected global smartphone market — not exactly a world-beating plan, keeping in mind the time frame. Consider: 2018 is five years away. Five years ago was the year the App Store first opened. |||||

Hello there, There is a pertinent story about a man who was working on an oil platform in the North Sea. He woke up one night from a loud explosion, which suddenly set his entire oil platform on fire. In mere moments, he was surrounded by flames. Through the smoke and heat, he barely made his way out of the chaos to the platform's edge. When he looked down over the edge, all he could see were the dark, cold, foreboding Atlantic waters. As the fire approached him, the man had mere seconds to react. He could stand on the platform, and inevitably be consumed by the burning flames. Or, he could plunge 30 meters in to the freezing waters. The man was standing upon a "burning platform," and he needed to make a choice. He decided to jump. It was unexpected. In ordinary circumstances, the man would never consider plunging into icy waters. But these were not ordinary times - his platform was on fire. The man survived the fall and the waters. After he was rescued, he noted that a "burning platform" caused a radical change in his behaviour. We too, are standing on a "burning platform," and we must decide how we are going to change our behaviour. Over the past few months, I've shared with you what I've heard from our shareholders, operators, developers, suppliers and from you. Today, I'm going to share what I've learned and what I have come to believe. I have learned that we are standing on a burning platform. And, we have more than one explosion - we have multiple points of scorching heat that are fuelling a blazing fire around us. For example, there is intense heat coming from our competitors, more rapidly than we ever expected. Apple disrupted the market by redefining the smartphone and attracting developers to a closed, but very powerful ecosystem. In 2008, Apple's market share in the \$300+ price range was 25 percent; by 2010 it escalated to 61 percent. They are enjoying a tremendous growth trajectory with a 78 percent earnings growth year over year in Q4 2010. Apple demonstrated that if designed well, consumers would buy a high-priced phone with a great experience and developers would build applications. They changed the game, and today, Apple owns the high-end range. And then, there is Android. In about two years, Android created a platform that attracts application developers, service providers and hardware manufacturers. Android came in at the high-end, they are now winning the mid-range, and quickly they are going downstream to phones under €100. Google has become a gravitational force, drawing much of the industry's innovation to its core. Let's not forget about the low-end price range. In 2008, MediaTek supplied complete reference designs for phone chipsets, which enabled manufacturers in

the Shenzhen region of China to produce phones at an unbelievable pace. By some accounts, this ecosystem now produces more than one third of the phones sold globally - taking share from us in emerging markets. While competitors poured flames on our market share, what happened at Nokia? We fell behind, we missed big trends, and we lost time. At that time, we thought we were making the right decisions; but, with the benefit of hindsight, we now find ourselves years behind. The first iPhone shipped in 2007, and we still don't have a product that is close to their experience. Android came on the scene just over 2 years ago, and this week they took our leadership position in smartphone volumes. Unbelievable. We have some brilliant sources of innovation inside Nokia, but we are not bringing it to market fast enough. We thought MeeGo would be a platform for winning high-end smartphones. However, at this rate, by the end of 2011, we might have only one MeeGo product in the market. At the midrange, we have Symbian. It has proven to be non-competitive in leading markets like North America. Additionally, Symbian is proving to be an increasingly difficult environment in which to develop to meet the continuously expanding consumer requirements, leading to slowness in product development and also creating a disadvantage when we seek to take advantage of new hardware platforms. As a result, if we continue like before, we will get further and further behind, while our competitors advance further and further ahead. At the lower-end price range, Chinese OEMs are cranking out a device much faster than, as one Nokia employee said only partially in jest, "the time that it takes us to polish a PowerPoint presentation." They are fast, they are cheap, and they are challenging us. And the truly perplexing aspect is that we're not even fighting with the right weapons. We are still too often trying to approach each price range on a device-to-device basis. The battle of devices has now become a war of ecosystems, where ecosystems include not only the hardware and software of the device, but developers, applications, ecommerce, advertising, search, social applications, location-based services, unified communications and many other things. Our competitors aren't taking our market share with devices; they are taking our market share with an entire ecosystem. This means we're going to have to decide how we either build, catalyse or join an ecosystem. This is one of the decisions we need to make. In the meantime, we've lost market share, we've lost mind share and we've lost time. On Tuesday, Standard Poor's informed that they will put our A long term and A-1 short term ratings on negative credit watch. This is a similar rating action to the one that Moody's took last week. Basically it means that during the next few weeks they will make an analysis of Nokia, and decide on a possible credit rating downgrade. Why are these credit agencies contemplating these changes? Because they are concerned about our competitiveness. Consumer preference for Nokia declined worldwide. In the UK, our brand preference has slipped to 20 percent, which is 8 percent lower than last year. That means only 1 out of 5 people in the UK prefer Nokia to other brands. It's also down in the other markets, which are traditionally our strongholds: Russia, Germany, Indonesia, UAE, and on and on and on. How did we get to this point? Why did we fall behind when the world around us evolved? This is what I have been trying to understand. I believe at least some of it has been due to our attitude inside Nokia. We poured gasoline on our own burning platform. I believe we have lacked accountability and leadership to align and direct the company through these disruptive times. We had a series of misses. We haven't been delivering innovation fast enough. We're not collaborating internally. Nokia, our platform is burning. We are working on a path forward - a path to rebuild our market leadership. When we share the new strategy on February 11, it will be a huge effort to transform our company. But, I believe that together, we can face the challenges ahead of us. Together, we can choose to define our future. The burning platform, upon which the man found himself, caused the man to shift his behaviour, and take a bold and brave step into an uncertain future. He was able to tell his story. Now, we have a great opportunity to do the same. Stephen.

- **Reference** - Why did Microsoft buy Nokia's phone business? We now know Microsoft's answer: The computing giant released a 30-slide presentation today arguing that the move will improve Microsoft's margins on Windows phones, which will allow it to invest

more in the platform, which will accelerate sales and market share growth, the Washington Post reports. But John Herrman at BuzzFeed has another explanation: "Fear of dying alone." Here's what he and other pundits are saying: The presentation "manages to sound both insane and uninspiring, outlining modest goals that still sound unrealistic," Herman argues—like capturing a whole 15% of the smartphone market. "It's a fitting end for the close of Microsoft's Ballmer era, during which the company . . . missed out on the most important change in consumer electronics in decades" while remaining profitable in unglamorous ways. Like everyone, Microsoft is trying to ape the Apple model, MobileOpportunity observes. But it's not so sure that's a good idea. "There already is an apple," the blog points out, and other software/hardware hybrid companies, like Palm and BlackBerry, have been crushed under its heel. Maybe Microsoft should have tried to patch up its tried-and-true strategy of licensing its OS. The move risks complicating Microsoft's crucial relationships with other PC and device manufacturers, one analyst tells ZDNet. But he adds that "Microsoft needed to make a bold move" or face "certain terminal decline," and that the price it paid for Nokia "seems extremely reasonable." Meanwhile, Matthew Yglesias at Slate digs up a fairly interesting memo from Nokia CEO (and, perhaps, Microsoft heir apparent) Stephen Elop, in which he uses the story of a Deepwater Horizon worker leaping from the burning oil platform—a seemingly desperate, yet necessary move—to explain the company's shift from its own failed OS to Windows Phone. Of course, Yglesias notes, that move "was basically a total failure." To read the full parable, [click here](#).

- **Generated summary:** The generated summary for each pretrained model:

Mm₁ - The seed for this crawl was a list of every host in the Wayback Machine This crawl was run at a level 1 (URLs including their embeds, plus the URLs of all outbound links including their embeds) The WARC files associated with this crawl are not currently available to the general public.. "Nokia benefits from higher RD spend as well as more marketing budget. Microsoft benefits from a good relationship with carriers, good direct channel presence in emerging markets, the potential of going after more aggressively to the business market," she told ZDNet. But for Milanesi, business is a secondary concern, even if it is an attractive target where Microsoft, and to a less extent Nokia, have experience: "First and foremost it needs to be about consumers. Enterprise are certainly a target especially considering the state BlackBerry is in but consumers make or break a phone vendor today." From Milanesi's point of view, emerging markets need to be a longer term target for Microsoft — but the battle needs to be won in the mature markets first. For Forrester principal analyst Thomas Husson, Nokia adds to Microsoft's developing market strategy. It's looking increasingly likely that the US and western European smartphone market is reaching saturation, so that most growth will come from emerging markets. Here Nokia's Asha devices could play a neat role as an on-ramp for consumers buying their first smartphone. Tied in with a revamped tablet strategy this could open up a new front against Android in particular. But Husson cautioned: "This is going to be a long journey. In some countries, Windows Phone 8 market share is now above five percent and close to 10 percent. It thus still offers a limited reach for developers and marketers. "Nokia is indeed still massively popular in some emerging countries but competition is very high with Far East manufacturers and low-cost Android devices. I think it will depend on Microsoft's new strategy for emerging markets beyond just mobile phones." All of this shows the number of competing — and occasionally contradictory — demands upon Microsoft's management. As the incumbent player in a fading market, Microsoft has to take into account those differing requirements as it tries to build for the future. For example, balancing Microsoft's business customers against the need to get into consumer tech, the need to build its own hardware business against the need to keep manufacturers onside, and building up a mobile business while protecting its PC heritage. It's easy to look at Apple's integrated hardware and software model and the rich ecosystem that sits around it, but it's much harder to emulate. Global coverage: Nokia Interim CEO: Microsoft deal makes

us stronger — Even with Nokia devices, Microsoft wants to license Windows Phone to other makers — Does its Nokia buy thwart or fuel a possible Microsoft break-up? — Microsoft shows how to flush decades of Nokia goodwill away — Microsoft gets less than \$10 per Windows Phone unit — Microsoft-Nokia deal: Reaction from the Twitter trenches — Elop drops Nokia CEO role to lead devices team under Microsoft deal Further readingMicrosoft is buying Nokia’s cell phone business and licensing its patent portfolio, according to both companies..

Mm₂ - Microsoft has agreed to buy Nokia’s cell phone business for red\$44 billion, reports the Wall Street Journal. The Finnish company’s share of the smartphone market was 35% in 2003, and the sale price includes \$1.65 billion in patents. ”It’s been a rough decade. Nokia’s cell phone collapse has been a spectacular one,” writes Richard Holway at TechMarketView. ”The story, in hindsight, is simple: Nokia did not have a truly compelling smartphone ready when a large segment of the developed world was first compelled by smartphones. Whether this was the result of complacency—Nokia was, in the mid-2000s, the leader of the niche smartphone category—doesn’t matter now,” he writes. Nokia’s miscalculations became impossible to ignore in 2008, the same year Microsoft decided, internally at least, to scrap its ancient and inadequate Windows Mobile platform in favor of something entirely new. Under these circumstances, it’s easy to imagine how a sort of camaraderie might have emerged at the time, or at least a mutual sympathy. Certainly a shared interest: to break back into the market from which they had been unceremoniously expelled. During the next two years, while Microsoft readied Windows Phone 7 and Nokia floundered on, the seeds of Sunday’s deal were sewn. A chastened Nokia was a natural partner for the tardy but determined Microsoft; it needed a software solution and Microsoft needed help with hardware. Now, with Stephen Elop returning to Microsoft after a job well done—well, a job, done—that plan has come to fruition. The only problem is that there’s little left to save. Windows Phone has barely dented the now much larger smartphone market. Nokia hasn’t had a Windows Phone hit. ”This incongruity—between a successfully executed, slyly strategic long-term merger plan and a much grander, more general sense of failure—might explain Microsoft’s deeply strange and somewhat sad stated goals for its Nokia acquisition,” writes Holway.

Mm₃ - The seed for this crawl was a list of every host in the Wayback Machine (WARC) that has a link to a Microsoft website. The WARC files associated with this crawl are not currently available to the general public. [||||] Summary: Microsoft’s acquisition of Nokia is aimed at building a devices and services strategy, but the joint company won’t take the same form as Apple. Microsoft gets deeper integration, but being a consumer-oriented company, it will have to be careful not to make the same mistakes as Apple or Google in the consumer market. Microsoft has been working on its evolution into a brands and services company, away from the services business it has traditionally been, for several years now with limited success. To be a winner in the business market it also has to be a bigger winner in mobile market, something that wasn’t the case a decade ago. Owning the desktop (via Windows) and building additional services on top, like Office or search, has been vital for

| Model | ROUGE-1 | ROUGE-2 | ROUGE-3 | ROUGE-L | CHRF-1 | Meteor | BertScore | FactCheck |
|-----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------------|
| <i>Mm₁</i> | 0.3796 | 0.0673 | 0.0047 | 0.1319 | 0.3693 | 0.2901 | 0.816 | 1.0 |
| <i>Mm₂</i> | 0.4012 | 0.0553 | 0.0092 | 0.1623 | 0.4027 | 0.256 | 0.8272 | 0.9 |
| <i>Mm₃</i> | 0.3333 | 0.0202 | 0.0 | 0.1406 | 0.2878 | 0.1605 | 0.7997 | 1.0 |

Table 2: Evaluation of Example-multi-document 2.

Example-Multi-Document-test10 Table 3 show the aggregated score of the evaluation of 10 multi documents from the multi-news test set. For the source document see Example-Multi-Document-test10document.csv in the project repository.

| Model | ROUGE-1 | ROUGE-2 | ROUGE-L | FactCheck |
|--------|---------------|---------------|---------------|--------------|
| Mm_1 | 0.3682 | 0.1348 | 0.1894 | 0.915 |
| Mm_2 | 0.4498 | 0.1781 | 0.2481 | 0.925 |
| Mm_3 | 0.3919 | 0.1306 | 0.1823 | 0.895 |

Table 3: Aggregated score of the evaluation of 10 multi documents from the multi-news test set.